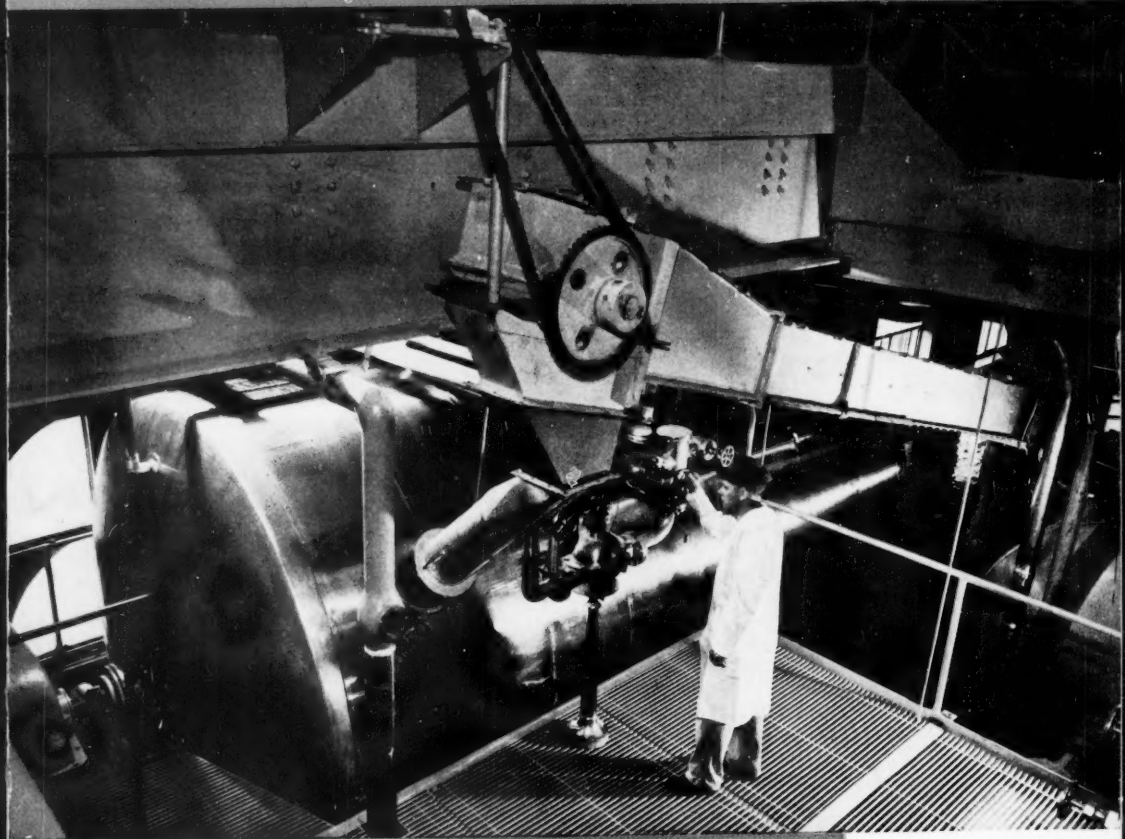
FOOD ENGINEERING

August 1951

A McGRAW-HILL PUBLICATION • FORMERLY FOOD INDUSTRIES

35 CENTS



Operator meters water to mash mixer in modernized Hamm Brewery; adjuncts are fed via closed conveyor, above (p. 92)

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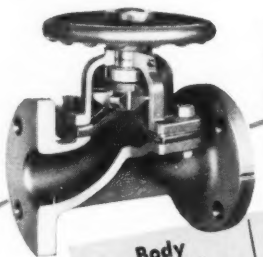
READER SERVICE DEPARTMENT

Adjacent to Inside Back Cover

WHAT WOULD **YOU** SPECIFY . . .

Fluid	Concentration	Temp.	Type of Valve	Valve Material
1 Sulphuric Acid	20%	120 F.		
2 Sulphuric Acid	100%	180 F.		
3 Hydrochloric Acid	32%	80 F.		
4 Hydrofluoric Acid	50%	125 F.		
5 Beer		200 F.		
6 Oxygen		Ambient		



We supplied Grinnell-Saunders Diaphragm Valves with . . .

Body Material	Diaphragm Material
1 Rubber lined	Natural rubber
2 Cast iron	KEL-F
3 Glass lined	Butyl
4 Magnesium	KEL-F
5 Polished bronze	White diaphragm
6 Cast iron*	Neoprene

*For oxygen service a low flash point lubricant is supplied. All valves for oxygen service are subjected to 300 lb. air underwater test.

In several of these cases other body materials or diaphragms would serve as well. But the really important fact is the unmatched versatility of Grinnell-Saunders Diaphragm Valves in handling corrosive fluids, gases, compressed air, food and suspended solids . . . in lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are problems.

Grinnell-Saunders Valve bodies are stocked in cast iron, malleable iron, stainless steel, bronze, and aluminum, with other materials available on special order. Valve bodies can be lined with lead, glass, natural rubber or neoprene. Diaphragms are available of natural rubber and a number of synthetics to suit particular service conditions.

The Grinnell-Saunders Valve Division will be pleased to submit recommendations upon receipt of complete information covering service conditions.

Features of the Grinnell-Saunders Diaphragm Valve

- diaphragm absolutely isolates working parts from fluid
- diaphragm lifts high for streamlined flow in either direction
- diaphragm presses tight for positive closure
- body, lining and diaphragm materials to suit service
- simple maintenance—diaphragm easily replaced

GRINNELL

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Grinnell Company Inc., Providence, Rhode Island • Sales Offices and Warehouses in Principal Cities

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco humidification and cooling systems

Food Engineering

Volume 23 AUGUST, 1951 Number 8

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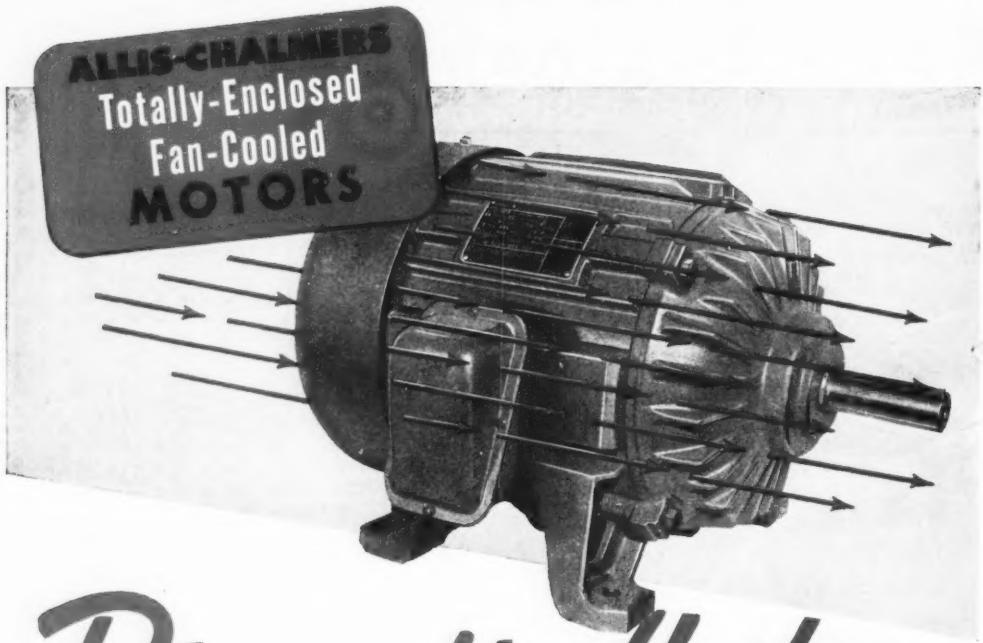

Blows itself clean as a Whistle!

DIRT IS CARRIED AWAY by cooling air blown over the ribbed cast iron frame and bearing housings of this new Allis-Chalmers tefc motor. That means less motor cleaning . . . inspection . . . overhaul!

Concealed air passages and pockets have been eliminated. Dirt can't build up to cause overheating. And as for oily dirt that sticks — just wipe or blow it off.

Studies show that on most applications, totally-enclosed fan-cooled motors more than pay back their extra cost in reduced maintenance. And this new Allis-Chalmers Type APZ tefc motor makes maintenance costs lower than ever before.

Rigid Construction

The frame is cast iron which has high resistance against corrosion and distortion. Bearings are pre-lubricated at the factory and should need no attention for years. Tapped holes with pipe plugs to permit regreasing and to provide grease relief are standard equipment.

Get All The Facts

The new Allis-Chalmers Type APZ totally-enclosed fan-cooled motor is built in all NEMA standard frame sizes from 224* to 505. Also in explosion-proof type. Your A-C Authorized Distributor or District Office has complete information. Call today, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B7225.

A-3427

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Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

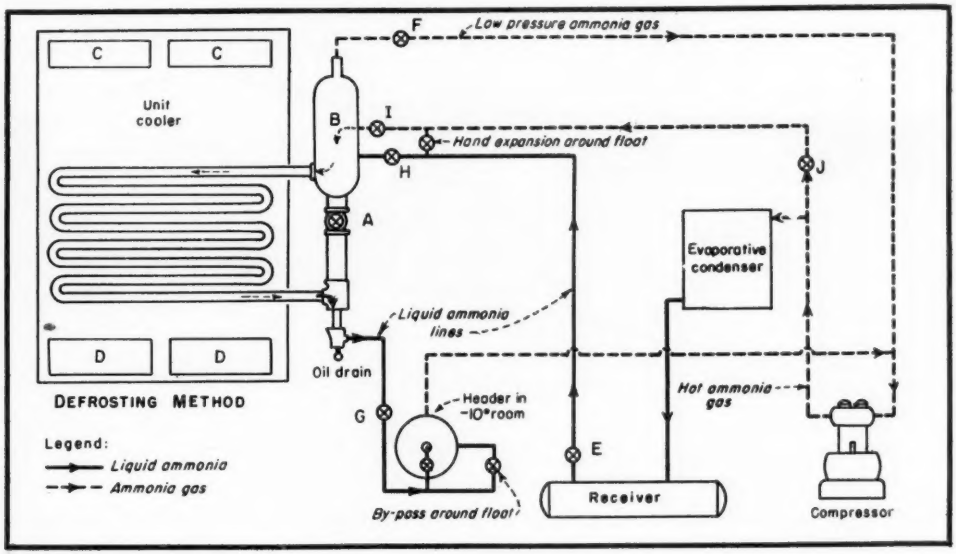
PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

Texrope and Vari-Pitch are Allis-Chalmers trademarks.

ALLIS-CHALMERS

*Similar design non-ventilated motors Type APK, also available in frames 203 to 224 inclusive.

PRACTICAL IDEAS



Two Refrigeration Kinks

Efficiency has been improved and costs reduced by two special applications of refrigeration at the Lehigh Valley Dairy Co., Allentown, Pa.

One is a method of avoiding a temperature rise in the ice cream hardening rooms during the defrosting of the unit coolers. The other reduces installation costs and improves temperature control through the use of liquid ammonia as the circulated coolant in place of brine or direct expansion of the ammonia.

Here are the details:

Defrosts Without Temperature Rise

Formerly, the method of defrosting unit coolers in the ice cream hardening rooms took so long that the temperature rose high enough to threaten quality. But there has been no appreciable drop in temperature since the new method of defrosting was adopted—draining liquid refrigerant from the system and by-passing hot gas from the compressor through the coils. To make this effective, it is necessary to have a header to receive the refrigerant, also to add a valve to the unit cooler. This valve—(A) in top drawing—is added below, and as close as possible to, reservoir (B).

Before defrosting starts, the blower motors on the unit cooler must be shut off and the ventilating dampers (C) and (D) closed. This prevents the heat developed during defrosting from entering the hardening room.

Next step is to close valve (E), which interrupts the flow of liquid ammonia to the coils. Then the ammonia is pumped or drained from reservoir (B) and from the coils to the level of valve (A). If any ammonia is left in the reservoir it will evaporate when hot gas enters the system, and it will counteract the effect of the hot gas.

Valve (F) is now closed so low pressure gas cannot escape to the compressor. And when valve (G) is opened —the next step—any pressure in the coils forces remaining liquid ammonia into the header. The latter must have sufficient surplus capacity to accommodate all the liquid ammonia in the coils and pipes of the cooler.

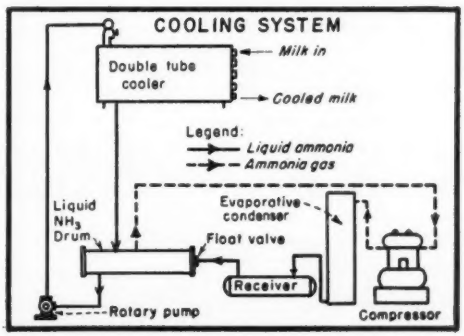
It is now time to direct the hot gas from the compressor to the coils. But first, valve (H) should be closed and valve (I) opened. These valves are operated only to by-pass the float valve. If this is not done, the speed of defrosting will be retarded and the seat of the float valve will soon wear out.

Hot gas from the compressor is admitted to the frost covered coils when valve (J) is opened. If the flow of water to the evaporative condenser is reduced, the condenser's efficiency will be lowered and a greater volume and pressure of hot gas diverted to the cooler to speed defrosting.

The hot gas quickly melts the ice on the coils, at which time the cycle is reversed. The entire defrost should be complete in not over 30 min.

Liquid Ammonia Used as Coolant

In some circumstances it is not advisable to use the direct expansion of the refrigerant for cooling. Sometimes, too, cooling with brine is not satisfactory. When



Here's how you can tell the chain with SHOT-PEENED rollers...

Thousands of tiny steel balls hammer the metal — "cold work" each roller . . . pay off in extra fatigue life . . . added ability to withstand shock and impact.

...the chain that has extra fatigue life

YES, you want to be sure you get shot-peened rollers on the next roller chain you buy. Shot-peening gives rollers the extra fatigue life needed to take repeated shock and impact loads.

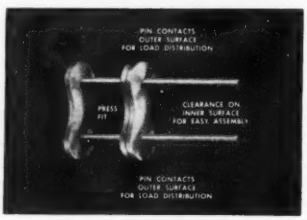
These chains are high in tensile strength, durable under severe loads, relatively light in weight and uniform in pitch. This accounts for their wide acceptance throughout industry for both drive and conveying purposes.

Thanks to constant research and precise manufacturing controls, every Link-Belt Precision Steel Roller Chain meets the highest standards for uniform strength. You get a positive, long-life drive — unaffected by heat, cold or moisture.

Link-Belt Roller Chain is available in single or multiple widths, in ⅜ to 3 in. single and double pitch. For all the facts, call your nearest Link-Belt office.

LINK-BELT

PRECISION STEEL ROLLER CHAIN


PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION
PRESS FIT
CLEARANCE ON INNER SURFACE FOR EASY ASSEMBLY
PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION

Easier coupling
and uncoupling without sacrificing load distribution

Patented E-Z Assembly feature of Link-Belt Precision Steel Roller Chain has won world-wide approval. Coupling and uncoupling of multiple width chains — right on the job — is far easier. There's absolutely no sacrifice of load distribution . . . no loss of the chain's remarkable performance. Press-fits between chain pins and middle bars have been modified. But full load carrying capacity across the entire width of the chain has been maintained.

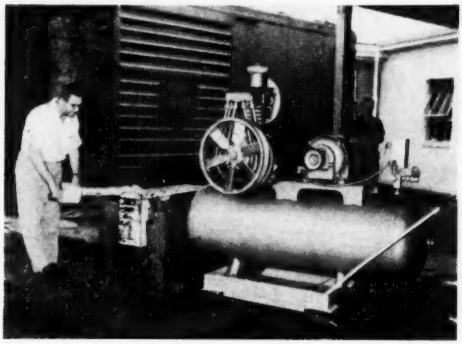
LINK-BELT COMPANY: Indianapolis 6, Chicago 9, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities. 12.332

these two methods are not suitable, the refrigerant itself may be used advantageously as the circulating medium for cooling.

Temperature of the liquid can be accurately controlled and rapidly varied when the refrigerant is circulated as a coolant. Such a system requires very little anxiliary equipment—less than when brine is circulated.

Second drawing (p. 5) shows arrangement. Liquid ammonia from the receiver enters the drum. It is kept at the required level by a float valve. The suction line of the compressor is piped to the drum. This induces evaporation, which lowers the temperature of the liquid ammonia remaining in the drum.

As a refrigerant the cold ammonia is pumped through a double-tube cooler and returned to the drum. Milk flows through the inner tube in the cooler, liquid ammonia through the space between the inner and outer tubes. The hook-up is simple, requires little extra equipment, and cools rapidly and uniformly.



Rig Delivers Air Wherever Needed

We designed and constructed a special truck for a unit compressor—and now have compressed air wherever it is required throughout the plant, in jiffy time and at a minimum cost in equipment and labor.

Our compressed air requirements are considerable and varied: We use it regularly for spraying insecticide—in the feeding-station section of our poultry processing plant, also in other areas. Continual plant painting is accomplished using a spray gun and the air. The maintenance department employs it for lubricating power-driven equipment and for the operation of tools during construction or repairs on plant and equipment.

To have air piped from a central station to all parts of the plant where it may be needed, the fabrication must, of course, be quite extensive. At our plant, this "rolling job" fills the bill. The compressor can be plugged in at the nearest outlet to the point of action. Current consumed by the motor is minimized because the motor runs only when air is used.

At present, one mounted compressor assembly weighing 800 lb. and delivering air at 100 lb. pressure is adequate for our needs.

To make it mobile, we mounted it on a specially constructed carriage having a bed of sheet iron welded to form a tray large enough to transport air hose, spray guns, air tools, and other equipment.

The unit has rubber tired casters spaced to permit an electric lift truck to slip under and raise and transport the assembly. This arrangement permits speedy delivery of the compressor assembly to any location in the plant.

The electric truck leaves the compressor assembly at its destination. On its own casters, the assembly is mobile enough to be moved locally as needed. A handle (pipe welded to the truck bed) aids in maneuvering the assembly after it is delivered by the electric lift truck.—*John W. Nelson, Plant Engineer, C. A. Swanson & Sons, Salisbury, Md.*

$50 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

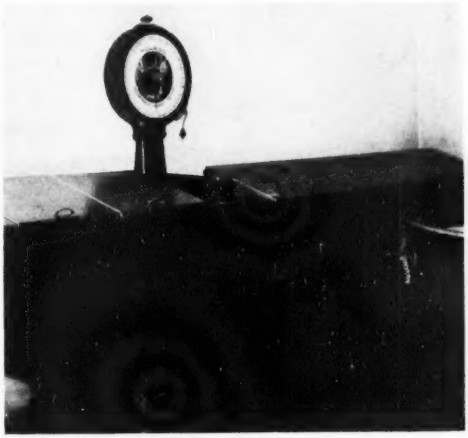
Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 18, N. Y.

JUNE PRACTICAL IDEA voted best was "Takes Burden Off Compressor," submitted by Warren Lancaster, Assistant Plant Engineer, Robert A. Johnston Co., Milwaukee. It described a method of unburdening the daily compressor load by collecting cooled sweet water at night.



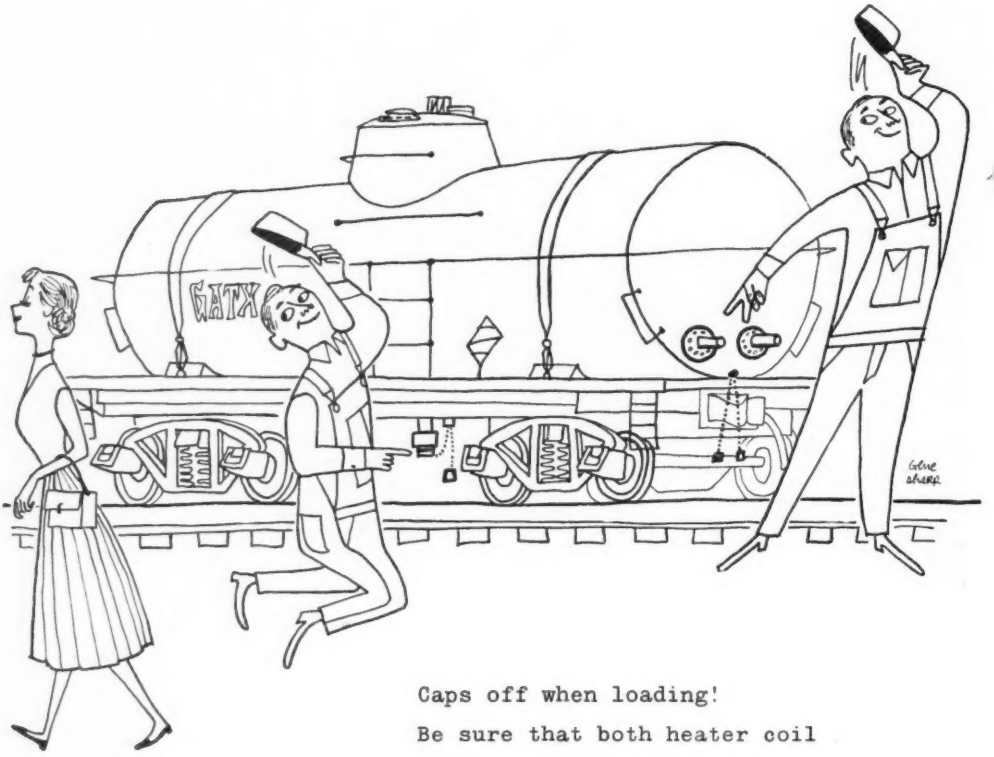
Protects Spices In Process Kitchen

Cabinets of special design can be of great value for facilitating operations with spices and at the same time afford ample protection for these expensive materials.

In the processed-meat department of a packing plant, location of the spice cabinets near the equipment is particularly advantageous. However, the machines and floors must be washed frequently—a practice that endangers the spices unless they are adequately guarded.

Through use of a special cabinet unit in its sausage

THE CARE AND NURSING OF TANK CARS



Caps off when loading!
Be sure that both heater coil caps and the outlet valve cap are off. Make certain that coils don't leak and the outlet valve operates properly.

Another way to get more from your GATX tank cars

GATX GENERAL AMERICAN TRADE MARK

GENERAL AMERICAN TRANSPORTATION CORPORATION
135 South La Salle Street • Chicago 90, Illinois

District Offices: Buffalo • Cleveland • Dallas • Houston • Los Angeles • New Orleans New York • Pittsburgh • St. Louis • San Francisco • Seattle • Tulsa • Washington
Export Dept.: 10 East 49th Street, New York 17, New York

So many people have requested reprints of these cartoon advertisements that we are making them available to you for use in your shops. Just write us.

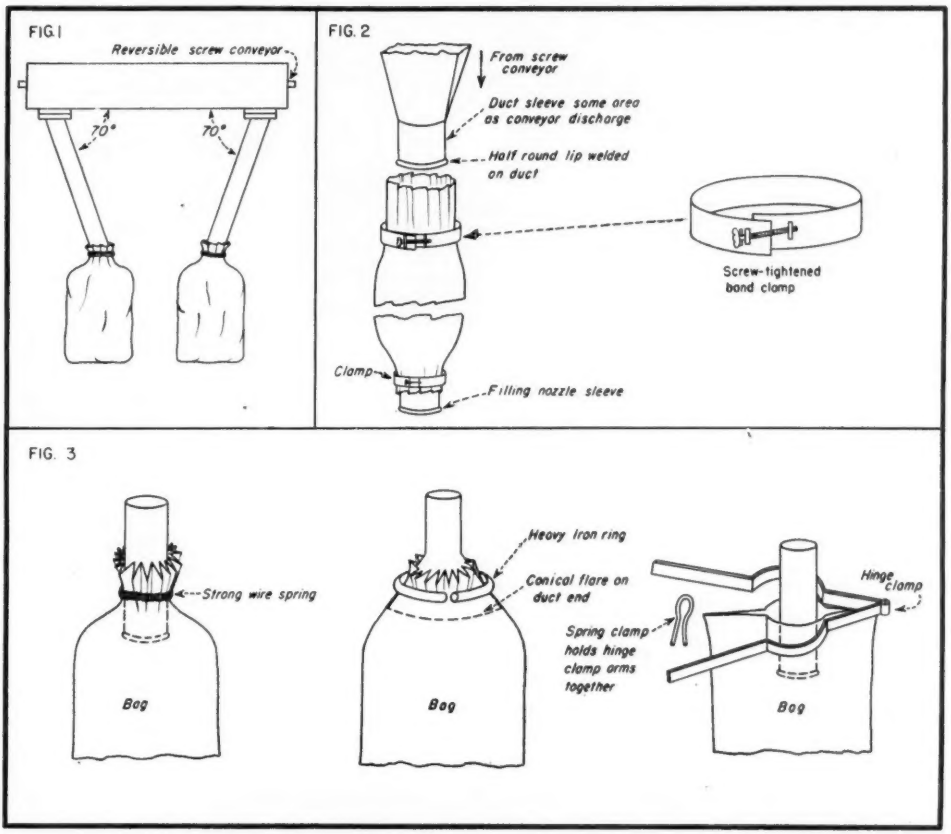
kitchen, Holly Meat Packing Co., San Francisco, has assured such protection for its spices at a place adjacent to the cutting machine where they are added to the meat.

The all-stainless-steel compartments of the cabinet unit vary in size in accordance with the demands made for the different spices. Largest bin has a capacity of 300 lb. Smallest bins are located in the center of the unit. Above them is the scale (see photo) for proportioning ingredients. Its handy placement in the center of the unit and at ideal working height reduces waste motions and thus saves labor.

Bin lids slope to provide rapid drainage during washing. Lips of the lids extend down approximately an inch over the sides of the bins when closed. Water and cleaning solutions drain over sides of the lids into sloping grooved troughs between the bins. These are safely below the overlapping sides of the lids, and they drain onto the floor.

Mounted on adjustable, screw-threaded feet, the unit can be leveled easily. And it is elevated above the floor high enough to permit adequate washing underneath during clean-up.

This cabinet reduces the space required for spice storage as well as the labor necessary to weigh and add the ingredients to the meat in the cutter. New kitchen can be washed down and cleaned as required—and the cabinets, too—without danger to the spices.—*Godfrey Lehman, San Francisco.*



Bagging Devices Prevent Dusting

A few simple devices can make the difference between a dusty operation with an ever-present explosion hazard and a clean, safe operation.

The case in question here is when dry powders are filled into cloth or multi-wall paper bags.

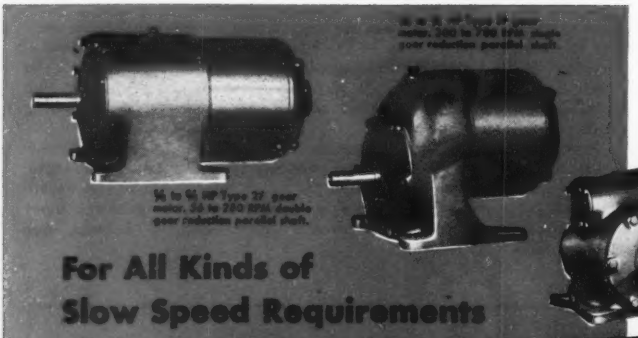
If processing has been conducted in a tightly closed system, the plant should be dust free, up to bagging of the product. However, in a tightly closed system, air pressure builds up sufficiently to cause heavy dusting in the final bag filling operation.

Dust formation in an otherwise dustless plant is frequent in the duct delivering powder to the bag, because dry powders tend to dust most when decending through an air column.

However, this tendency to form dust in the delivery duct can be minimized if the downward slope of the duct is at the correct angle (see Fig. 1). Least dust will form when the angle of decent is 65 to 70 deg. from the horizontal, for then powders do not bridge or clog in the duct.

Efficiency of filling is increased if bags are supplied from two ducts delivering from both ends of a reversible conveyor. When one bag is filled, the conveyor is reversed to fill the other bag, while the filled bag is tied off and replaced.

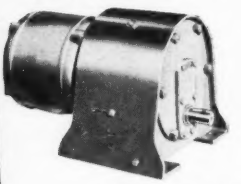
Canvas ducts are superior to metal ducts, because though entrapped air can find a ready exit through the fabric,



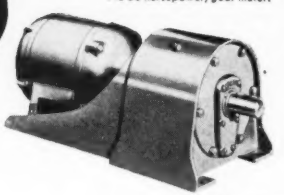
For All Kinds of
Slow Speed Requirements

Specify
Century GEAR MOTORS
Rugged, Quiet,
Long Life Operation

⅛ to ¾ HP Type 2R gear motor. 4.3 to 125 RPM double gear reduction right angle shaft.



1 to 50 horsepower, gear motor.



1 to 50 horsepower all motor type gear motor

1 to 50 horsepower, vertical all motor type gear motor.

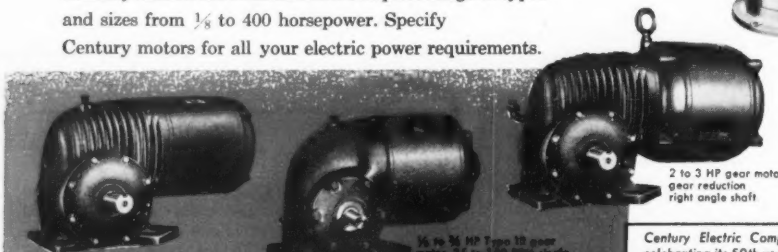
There are dozens of reasons why Century gear motors assure satisfactory performance day after day. Here are a few of them:

Simple design, coupled with accurate machining and rugged construction, produces a rugged unit that stays in alignment.

Precision gear cutting assures quiet operation.

Streamlined design provides improved appearance and smooth easily cleaned surfaces inside and out.

Century Gear motors are available in a wide range of types and sizes from ⅛ to 50 horsepower—in a variety of speeds. Other Century motors are available in a complete range of types and sizes from ⅛ to 400 horsepower. Specify Century motors for all your electric power requirements.



2 to 3 HP gear motor Single gear reduction right angle shaft

1 to 1½ HP Type 1R gear motor. 37 to 280 RPM single gear reduction right angle shaft.

Century Electric Company is celebrating its 50th year in the electrical industry.

-692

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Century C MOTORS

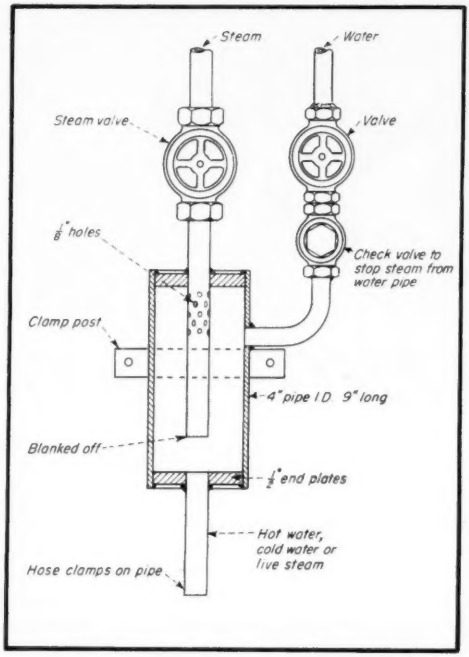
no dust can escape. Venting the air removes the cause of dusting.

When canvas ducts are used, a metal sleeve (Fig. 2, p. 9) should be fitted into the delivery end to serve as a bag-filling nozzle (to which the bag can be firmly attached). The canvas duct is secured to this nozzle by a detachable collar or clamp about the nozzle, and in a similiar manner to the conveyor outlet duct.

With the devices detachable, the canvas can be removed for necessary trips to the laundry.

As the powder leaves the filling nozzle and enters the bag, some dust will form. Its escape can be prevented, however, by using a device for holding the mouth of the bag tightly around the filling duct (three different methods are shown in Fig. 3, p. 9).

If the whole procedure described here (Figs. 1, 2, 3) is followed, the bag filling operation should be as dust free as the closed processing system.—*W. A. Reed, Taylor Reed Co., Glenbrook, Conn.*



Steam-and-Water Mixer Made of Scrap

A few hours of labor on odds and ends and scrap pieces will serve to make an inexpensive water-and-steam mixer that is both efficient and long lasting.

We learned the trick during the recent war, when materials here in Australia became so critical that our meat plant could not replace its cast iron hot water make-up mixers as they wore out. We were using about 20 at the time—finding them very necessary for hot hosing water.

We replaced the cast iron mixers with units fabricated to our own design from salvaged parts (as shown above).

Mild steel was the material used to make our first mixers. The construction of each required the labor of two men for 3½ hr. These mixers lasted only 18 mo. to 2 yr., but the welding of replacements required less than 1 hr.

Holes in the steam pipe inside the mixer, through which steam makes contact with the water, should be of ⅛ in. dia., and total area of all of them should equal the area within the pipe circumference—and no more. It is necessary to blank off the end of the steam pipe to insure silent and efficient operation.

Later, we made our mixers of copper when this metal again became obtainable. These units proved more durable, 7 yr. of use demonstrating their long life and efficiency. They are an instant source of hot water, and their operation is silent and dependable.—*F. C. Beavan, Victoria, Australia.*

Longer-Life Cutting Table

Your cutting table will last longer and you will get improved sanitation, as well, if you replace the wood surfaces with a new type rubber-plastic.

Those who are familiar with meat cutting know the disadvantages of wood for cutting, trimming and boning operations. Wood is porous. It absorbs fluid from the meat and also water during washing, hence soon becomes odorous. It is difficult to clean. It splinters and its life is short.

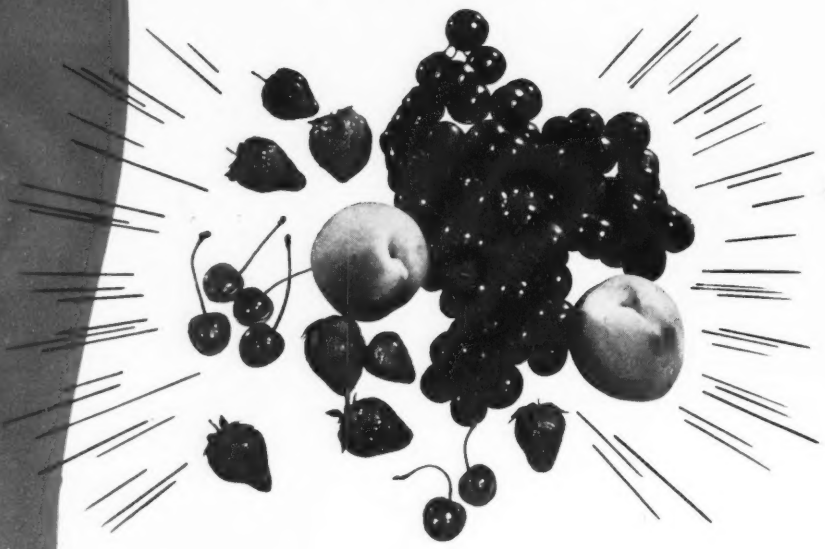
At our company, most of the problems resulting from cutting meat on wood have been solved. We have installed boards of synthetic rubber and thermoplastic materials made by United States Rubber Co. And after almost 2 yr. of experience cutting meat on these surfaces we have found them much superior.

The boards we use are of but 1 in. thickness, yet they have not warped, though they are washed frequently. They do not splinter, nor do they absorb meat fluid or moisture. They are therefore odorless. Because of the smooth surfaces they are easily cleaned.

Life of the rubber-plastic boards is decidedly longer than that of the wood we formerly used. Just how long our new boards will last we don't know. For in these 2 yr. we have only cut against one side and it is still "going strong." Thus, we have the use of the other side "coming up" whenever the first side is past using.

Though the new surfaces are easier on knives than wood, they should not be used for heavy chopping. Knives do not cut the rubber-plastic, but it may be dented by hard-chop impacts.—*Milton Berk, Milton Berk, Inc., N.Y.C.*

THERE IS SOMETHING NEW



IN *TRUE FRUIT* FLAVORS!

By adopting and improving on the new discoveries in fruit concentration WITHOUT THE USE OF FLAVOR KILLING HEAT, the ALVA laboratories now offer True Fruit flavors containing a considerably higher percentage of the fugitive volatile essences so vital to the fresh, true flavor of natural fruits.

Normally lost in distillation, these essences are initially captured and ultimately returned to the concentrate in the unusual equipment built by ALVA technicians. The result is a concentrate that is fresher, possesses more body and will go further in natural flavoring.

This remarkable technique is now standard in the production of ALVA True Fruits.

There's a difference . . . All the flavor is there . . . We'll send you samples for comparison.

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A few of the many technical packaging achievements which have helped bring more profits to many industries (possibly yours) and more pleasures into many lives.

1. Canco made possible the first commercial application of the vacuum-pack and vacuum-closure principles to the canning of vegetables.

2. Canco established the first Nutrition Laboratory devoted solely to the problems of the canning industry.

3. Canco established the first specifications for the chemical composition of steel used in the manufacture of corrosion-resistant tin plate.

4. Canco discovered the cause and control of a widespread type of off-flavor spoilage in tomato juice, due to an organism which Canco isolated and named.

5. Canco invented the Tenderometer which provides a means of quality control of raw green peas.

6. Canco published the first of a series of education texts on nutritive values and public health aspects of canned foods.

7. Canco publishes the one and only "Canned Food Reference Manual" (3 editions) now widely used in schools and colleges and by the medical and public health professions.

8. Canco first established a system of tempers for tin plate to produce better formed and stronger cans.

9. Canco invented the "High-Short" aseptic closing systems of canning for liquids and for solids.

10. Canco first applied commercially the new Agitation principle in the vacuum packing of vegetables.

11. Canco pioneered and developed the low-oxygen closure (L.O.C.) method for fruit juices and beer.

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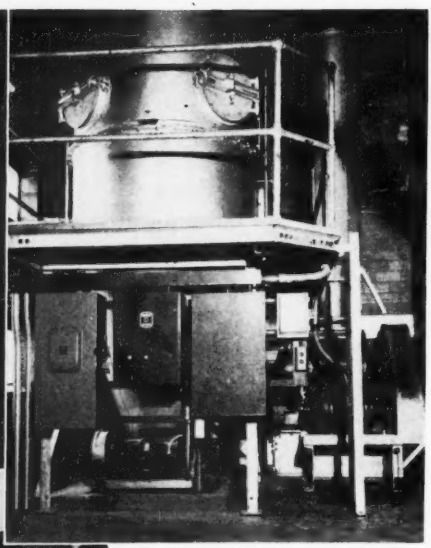
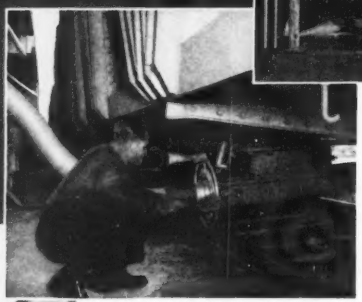
UNLOAD FLOUR FROM BAGS OR BULK CARS WITH The AIRVEYOR®

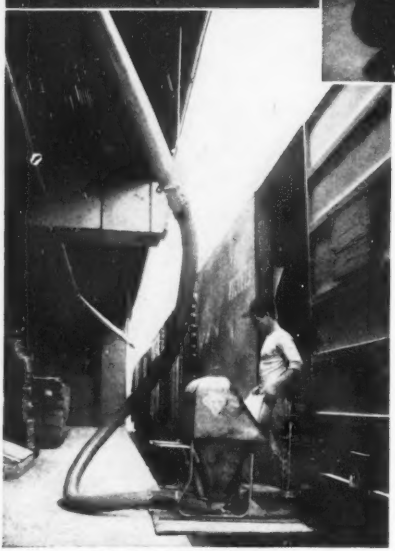
Safely Simply Efficiently Economically!



The heart of the Airveyor . . . Filter, separating material from conveying air, with 100 percent visible retention of dust . . . exhauster on right, background.



Attaching flexible metal hose to hopper of a Trans-Flo bulk car, unloading semolina.



Airveyor unloading semolina from bags shipped in box car. Bags are opened and contents dumped into portable hopper, to which the same flexible metal hose, used for unloading bulk cars, is attached. As bags are removed adjacent to the car door, the hopper is moved further back into the car, for more efficient unloading.

It doesn't matter whether you receive flour in bags or bulk, the Airveyor can be adapted to handle it in either manner . . . efficiently, rapidly, and without loss of material.

The Airveyor will unload and convey, in one operation, from cars to storage, or direct to process, if desired. The system can be so arranged as to blend while reclaiming from storage . . . can be designed to convey to any number of delivery points, in a dustless, sanitary manner. No mechanical conveyors need be used . . . no bothersome cleaning . . . the system is self-scouring.

During the past few years the Airveyor has been installed for the handling of flour, and other food products, in 16 plants, with a total of 31 systems in operation. In addition to this, there are under construction, 13 systems for installation in five plants.

If costs for conveying flour and other similar products have been cutting into profits . . . if labor and maintenance costs have been climbing . . . you'll find it profitable to call in a Fuller engineer. Chances are he can show you how minimum expenditure can bring you a conveying system that means maximum operating efficiency, and consequent improvement in profits.

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"Flavor Fading" is a profit thief!

Guard against it with ZEST . . . the amazing seasoning that *magnifies natural flavor* in processed foods!

Gradual, hard-to-detect "flavor fading" can rob you of untold sales every month of the year. Protect your foods from this invisible profit thief with wonder-working ZEST. Hundreds of food processors have discovered that ZEST, Staley's 99+% pure Monosodium Glutamate, works flavor miracles with practically all kinds of foods! ZEST is the amazing food seasoning that brings out every bit of the natural flavor of the food itself. It adds no flavor, no aroma, no color of its own . . . but simply intensifies every bit of the delicious *natural* flavor goodness.

ZEST seasoning perks up the flavor of meats, vegetables, fish and seafood, sauces and gravies of all kinds, stews, chilis and chowders. It works equally well on frozen, canned or dehydrated foods. Important too, is the fact that these instantly soluble crystals require no changes in your formulas . . . you can add ZEST before, during or after your processing.

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BUSHELS, TONS, BOXES—America's fish and fowl, livestock, crops, and other food products are measured in multi-millions as they pour annually into the world's greatest market basket. But this national wealth is more valuable because it can be distributed, served, and preserved. In the food processing and preserving industries you'll find Gas in one of its most important economic roles.

FOR MEATS, FISH, FOWL the various heat-processing functions are performed by Gas. Smoking, rendering, baking, steaming, roasting—these are just a few of the vital operations in the packing industry where the productive flames of Gas are applied to the preparation of food for future use.

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Master Motors, available in thousands and thousands of types and ratings (up to 150 HP), give you an enormous selection of units designed so that they easily combine to give you a power drive that will add greatly to the compactness, safety and economy of each job. Open, enclosed, splash proof, fan cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 432 to 1 ratio . . . with electric brakes . . . with mechanical variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best motor drive for YOU.

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Select the RIGHT power drive from Master's broad line and you can increase the salability of your motor driven products . . . improve the economy and productivity of your plant equipment.

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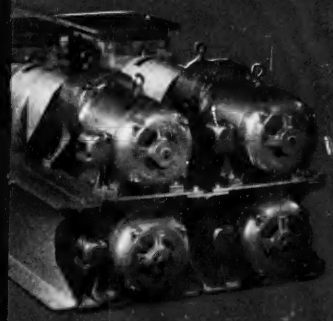

the **RIGHT** shaft speed

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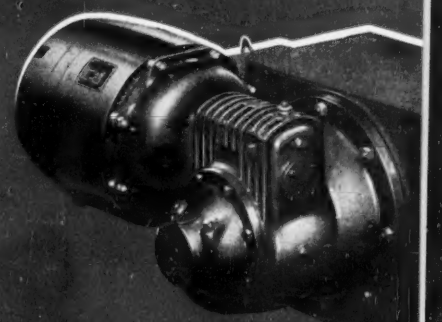

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for added richness
in your food flavors:

CORPS PRALINE

Exceptional results have been achieved in mixtures of fruit and food flavors through the addition of CORPS PRALINE. It is a synthetic aromatic of ketonic nature, whose presence in minute quantities produces unusual, enriched flavor effects.

CORPS PRALINE is a crystalline substance of highest purity, remarkably stable under cooking and baking temperatures. It has a natural-type, fruity aroma when used in fruit flavors; in higher concentrations in mixtures or when used directly in food products, it tastes somewhat like caramel.

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With This NEW Improvement Niagara "No-Frost Method" puts you a big step ahead in trouble-free, automatic refrigeration or freezing

Niagara "No-Frost Method" keeps frost and ice COMPLETELY OUT of your cooling, chilling, freezing or cold storage.

It uses Niagara No Frost Liquid Spray to keep frost and ice from ever forming. It gives you, automatically, refrigeration with no defrosting, and full capacity NEVER cut down by ice building up progressively on refrigeration coils.

Now, a NEW design No Frost Liquid concentrator, using a new principle, takes away moisture as fast as it is condensed by evaporating it at low temperature—not boiling it away at high temperature. It has 14 times the capacity of the old method per dollar of investment—one concentrator will handle a battery of high capacity spray coolers.

This gives you more refrigeration at lower cost; less machinery in less space. You operate at high suction pressure, saving power and wear and tear on compressors.

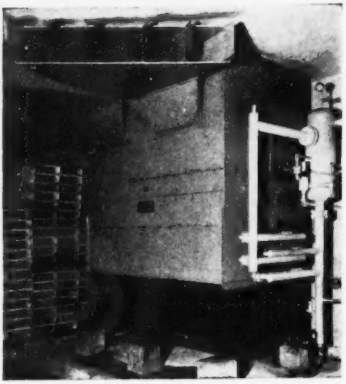
The extra capacity and lower cost both for equipment and operating makes this method advantageous for every type of refrigeration use—both for freezing and for moderate temperatures—for large "live" loads as in meat chilling or in fruit and vegetable pre-cooling—for rooms that are filled and emptied of product daily, such as milk rooms and terminal storage warehouses.

You get true trouble-free refrigeration . . . No brine . . . no salt solution . . . no dirt . . . no mess . . . It is entirely clean; you get rid of dirt and odors. You reduce both equipment and operating costs.

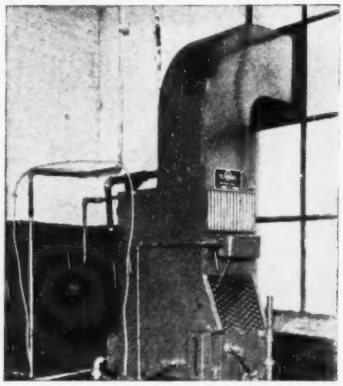
With Niagara "No-Frost Method" you easily keep constant temperature of products in your rooms, improve quality, get more production.

There are two series of concentrators: one, with evaporating capacity up to 6 gal. of water per hour, is economical for small freezing or hardening rooms, milk rooms, single room storage. The other, evaporating up to 36 gal. per hour, serves a battery of large coolers as in multiple floor cold storages, large chilling, freezing or pre-cooling plants.

For complete information write to the Niagara Blower Company, Dept. FI, 405 Lexington Avenue, New York 17, New York.



Niagara No Frost Spray Coolers
PATENTED
With the "No-Frost Method" you always get the full amount of refrigeration your compressor will deliver and for which you are now paying. If you need extra capacity, the Niagara "No-Frost Method" can help you get it with your present compressor.



Niagara No Frost Concentrator
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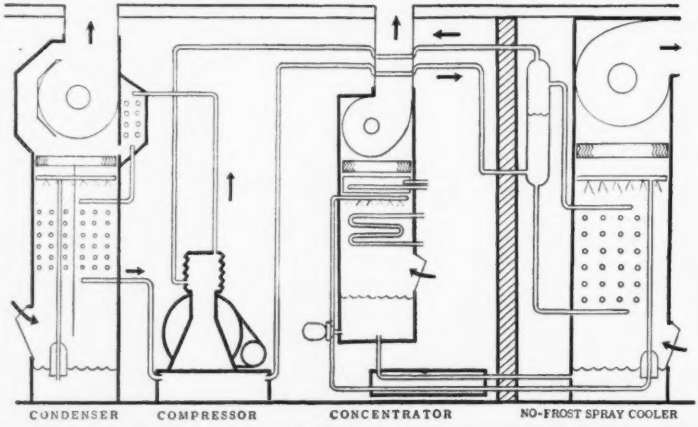
No salt solution . . . No brine . . . The Niagara "No-Frost Method" gives you a clean system, clean rooms, clean equipment.



SPARKLING ALCOA FOIL

gets it to the front... FRESH!

MIGHTY important . . . this foil-lined packet. Part of a soldier's daily combat ration, it includes several necessary things—cigarettes, coffee, sugar, milk, matches.

Guarding supplies like these—from factory to front, is only one of the many ways Alcoa Aluminum Foil serves. Laminated to a wide variety of barrier materials, foil also helps protect delicate electronic equipment, tanks, guns, medical supplies from the hazards of shipping, storage, heat, dust, moisture.

Is Alcoa Aluminum Foil available for packaging *your* product? That depends on current government restrictions. Best qualified to answer this question are leading packaging firms—pioneers in protective packaging, *in Alcoa Foil.* May we send you their names?

Write to: Aluminum Company of America, 1765H Gulf Building, Pittsburgh 19, Pennsylvania.

Gets fast, accurate feeding and blending control with G-E adjustable-speed drives

General Mills' G-E Thy-mo-trol* drives in new flour milling plant adjust flour flow to the capacities of succeeding equipment

For blending or adjusting flow at this plant, taper screw feeders, accurately governed by the speed of G-E Thy-mo-trol drive motors, take just the right amount of flour from overhead bins, feed it down to gather-up conveyors.

Regulating the flow of flour to the packer and the proportional blending of many different varieties of flour—to meet customers' specifications exactly—is an easy matter with General Elecrtic Thy-mo-trol drives at the new Sperry Division flour-milling plant of General Mills at Vernon, California. Fourteen of these packaged adjustable-speed drives provide the close speed control and wide speed range needed to adjust the flow of material to succeeding machine capacities or to assure precisely the right mix every time in blending—without undergrading or over-grading of blends. Result: substantial savings in processing time and costs.

Thy-mo-trol—most accurate, most versatile, and fastest-acting of G-E's adjustable-speed drives—can provide literally thousands of speeds over a range as high as 100 to 1, holds set speed to within 0.5 per cent, if necessary, regardless of load changes. And it's only one of many G-E packaged adjustable-speed drives from which you can choose to meet your every food-processing need. Ask your G-E food industry representative to help apply the benefits of packaged adjustable speed to your plant. *General Electric Company, Schenectady 5, N. Y.*

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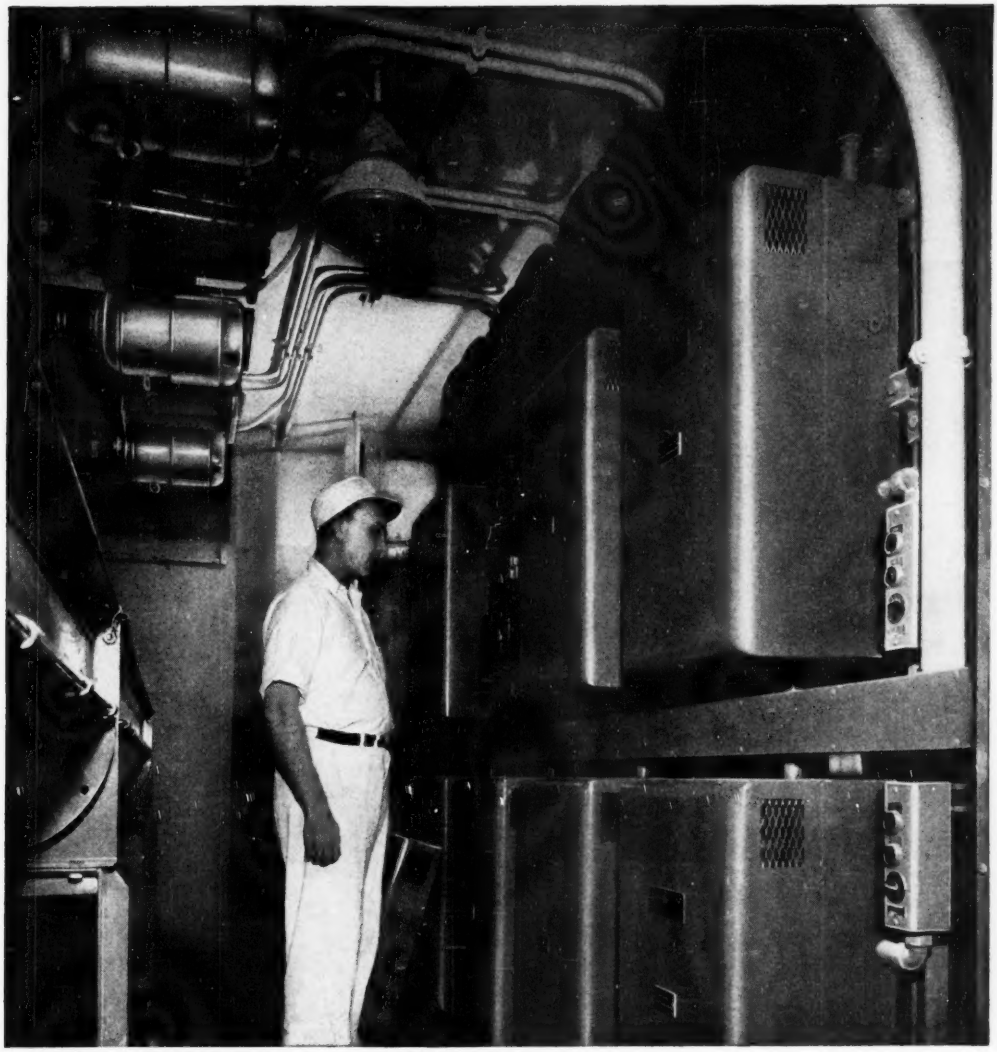
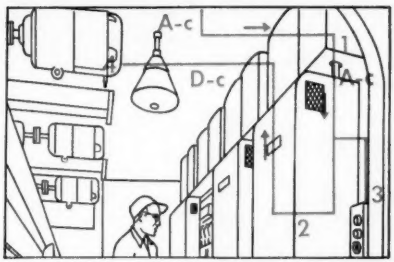
ADJUSTABLE-SPEED DRIVES

for food processing

USE THIS GUIDE TO THE RIGHT DRIVE!

Here's a comprehensive 26-page illustrated manual that tells all about adjustable-speed drives—their advantages, their operation, and how to select the right drive for *your* food processing needs. It's yours for the asking—Bulletin GEA-5334. Send, too, for Bulletin GEA-5337, describing Thy-mo-trol drives in full.





How Thy-mo-trol drive works. Diagram of a typical G-E Thy-mo-trol drive at the General Mills plant shows how a-c power is first brought to utilization voltage at a dry-type transformer (1) and then goes to the rectifier panel and "brain" (2). Here it is electronically converted to d-c and controlled from an operator's station (3) containing start and stop push buttons and speed-setting dial. D-c power is then delivered under precise electronic control to the d-c motors (4) driving the feeders (latter shown partially at left). Easy to install, operate, and maintain, Thy-mo-trol drives assure food plants the cost-cutting benefits of adjustable speed even under the most exacting conditions.

GENERAL ELECTRIC

6529

JAMISON super freezer doors

for modern ice cream plant

Model Walgreen Chicago Commissary and Ice Cream Plant
One of Nation's Largest

OUTSIDE . . . Sturdy Metal-Clad Door

America's "biggest names in cold storage" regularly team up with America's "biggest name in cold storage doors." This time it's WALGREEN and JAMISON. Through Jamison Super Freezer Doors on Walgreen loading docks pass 3,000 gallons of ice cream, stored at 20 degrees below zero temperature. E-Z Open Two-Point Fasteners maintain tight seal.

INSIDE . . . Sanitary Stainless Steel Clad Doors

Jamison Stainless Steel interior doors harmonize with immaculate tile and other stainless steel equipment. Vertical Stainless Steel clad, smooth-sliding door along side permits the rapid, trouble-free handling of 1,000 gallons of ice cream in a single hour—carried on conveyors in pint containers! Get all the IMPORTANT facts. Write for Catalog today. Jamison Cold Storage Door Co., Hagerstown, Md., U. S. A.

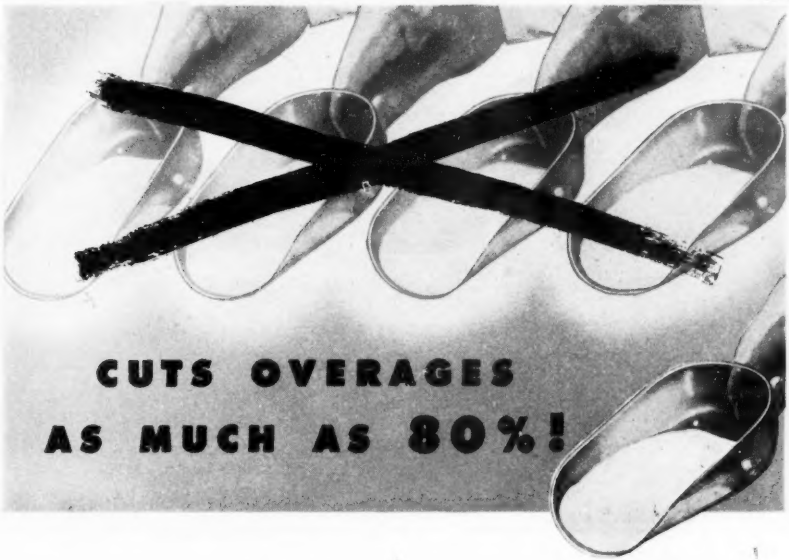
JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

The oldest and largest builder of insulated doors in the world.

Crystalets*

PFIZER'S NEW STABILIZED VITAMIN A



Excessive and costly Vitamin A overages in dry food products are no longer necessary to insure compliance with labeled potency throughout shelf life. Crystalets, Pfizer's new Crystalline Vitamin A Acetate, stabilized by a patented process, retain at least 90% of their potency after exposure equivalent to two years of shelf life in a temperate climate. This assures a margin of safety with an overage of less than 10% instead of up to 50% as was formerly necessary. When you reduce the overage, you produce more Vitamin A products with the same number of U.S.P. units you've bought in the past.

This new Vitamin A is stable in the presence of other vitamins and ingredients which you may incorporate in your product. And the dry granules are easier to handle...no undue precautions need be taken.

Packed in bottles and drums at a potency of 500,000 U.S.P. units per gram. Available in 3 mesh sizes.

VITAMIN A PALMITATE

Derived from pure Crystalline Vitamin A Acetate, this product has outstanding purity and high potency. It is packed in aluminum bottles under nitrogen at a potency of not less than 1,600,000 U.S.P. units per gram. Also available in corn oil at 1,000,000 U.S.P. units per gram.

*trademark

PFIZER QUALITY ® PFIZER

Pioneers & Leading Manufacturers of Vitamins

CHAS. PFIZER & CO., Inc., 630 Flushing Ave., Brooklyn 6, N. Y. • 425 N. Michigan Ave., Chicago 11, Ill. • 605 Third St., San Francisco 7, Calif.

For The Blatz Brewing Company which uses Standard-Knapp packers and conveyors in its new bottling plant. "We certainly are happy," reports Blatz, "with the performance which our Standard-Knapp equipment has rendered during three years of operation in our new bottling plant. This department has recorded an amazingly high degree of efficiency in regular evaluations and much of that efficiency is due to the continued and dependable operation of Standard-Knapp packers."

Only the best is

OTHER EMHART PRODUCTS INCLUDE:

PLASTIC BOTTLES, RODS, TUBES, SPECIAL SHAPES

PLAX CORPORATION

Subsidiary of Emhart Mfg. Co.

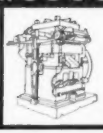
HARTFORD 1, CONNECTICUT

PREMIUM QUALITY STAMPING PRESSES

THE V & O PRESS CO.

Division of Emhart Mfg. Co.

HUDSON, NEW YORK



HIGH SPEED AUTOMATIC PRESSES

HENRY & WRIGHT

Division of Emhart Mfg. Co.

HARTFORD 5, CONNECTICUT

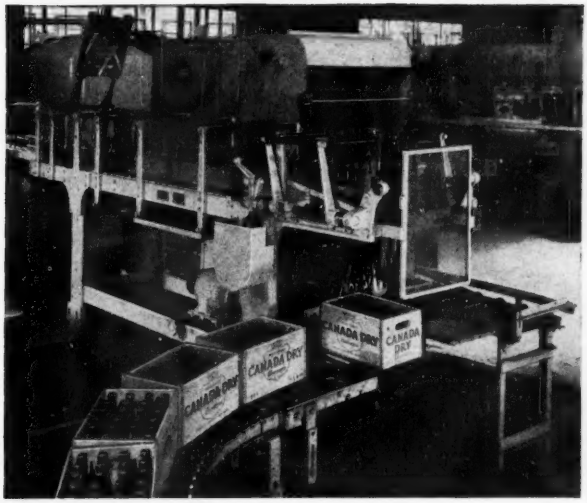
GLASS MAKING MACHINES

HARTFORD-EMPIRE CO.

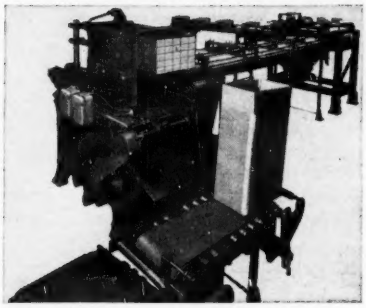
Division of Emhart Mfg. Co.

HARTFORD 2, CONNECTICUT

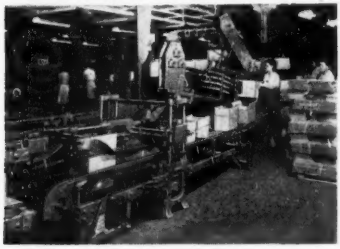
In the field of automatic packaging equipment



For Canada Dry where Standard-Knapp bottle packers help this famous company maintain its production lines at top efficiency. Standard-Knapp bottle packers—and other automatic packaging machines—are the choice of leaders in every field seeking speed and dependability now and for the years ahead.



For American Tobacco which keeps its packaging lines moving at peak efficiency with the aid of Standard-Knapp gluers and sealers, collectors and carton packers. In the field of automatic packaging, Standard-Knapp machines are automatically preferred.



For The Food Industry

Standard-Knapp machines are automatically and efficiently unloading empty bottles . . . rinsing glass containers . . . labelling cans and bottles . . . packing filled cans, bottles, cartons and bags into shipping cases . . . gluing and sealing shipping cases . . . printing, coding and dating.

good enough

FACT-PACKED CATALOGS

Want to review Standard-Knapp automatic packaging machines in detail? Our catalogs will give you some eye-opening facts. Please write Dept. F, Standard-Knapp, Portland, Connecticut.

STANDARD-KNAPP

DIVISION OF
EMHART MFG. CO.

PORTLAND, CONNECTICUT

WASHINGTON STEEL CORPORATION

MicroRold Stainless Steel

WASHINGTON, PENNSYLVANIA — PHONE: WASHINGTON 5900

T. S. FITCH
PRESIDENT

August 1, 1951

OPEN LETTER TO THE DISTRIBUTORS OF MICROROLD STAINLESS STEEL SHEETS

The current demand for Type 430 sheet is certainly a tribute to you distributors, and we want to take this opportunity to thank you for a job well done.

Because there is not sufficient nickel we asked our distributors, in July 1950, to explore the practicability of substituting Type 430 straight chrome stainless steel. While it is recognized that Type 430 is not a "cure-all", there are many applications where it does adequately provide the required corrosion resistance and other desirable characteristics.

We also wish to reassure you that we shall endeavor to allocate our production in an equitable manner.

Cordially yours,

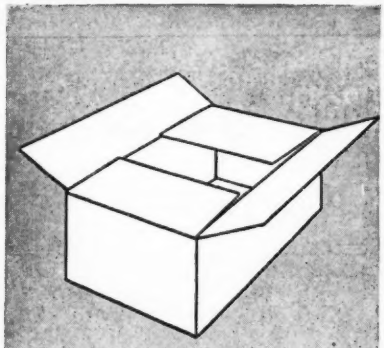
TSF:HH

WASHINGTON STEEL CORPORATION

T. S. Fitch
President

PS.--You are aware of the fact that the government regulations require us to supply 40% of our production for Defense Uses; this obviously means that we cannot provide as much tonnage for non-defense purposes as we used to provide, nor as much as we would like to provide, at this particular time.

T. S. F.



Save Up to 65% on case sealing costs with Findley's

109 BOX-WELD

CUTS COSTS 5 WAYS

- **Low Initial Cost**
- **Permits increased speed**
- **Handles a wide variety of stock**
- **Gives greater mileage**
- **Eliminates production waste and down time**

No. 109 BOX-WELD is a product of The F. G. Findley Company. Manufactured for distribution on the east coast by the Union Paste Company, Hyde Park, Massachusetts.

Developed as an alternate for high speed, versatile resin emulsions during recent shortages, Findley's 109 BOX-WELD is actually outperforming them in many cases.

The speed, performance and mileage given by BOX-WELD has cut sealing glue costs by as much as 65%!*

READY TO USE — NO DILUTION NECESSARY. This means consistent uniformity — no erratic results due to improper dilution; and elimination of labor costs that go with diluting.

FAST BONDING. Because of No. 109's extremely high wet adhesion, it holds tough, springy flaps faster and better. No. 109 does a 100% job on lines with as little as 15-20 seconds compression.

VERSATILE. Findley's' BOX-WELD is ideal for use on any case sealing machine or by hand. It handles corrugated and solid fibre; Kraft and jute, dense, high finished or soft, porous liners.

A PREMIUM PRODUCT AT A COMPETITIVE PRICE. On a price-performance basis, No. 109 BOX-WELD challenges comparison.

**Actual field runs have proved the dollar-saving superiority of Findley's No. 109 BOX-WELD. The results of these tests are available.*

Get the facts now. The coupon, on your letterhead will bring you the proof:

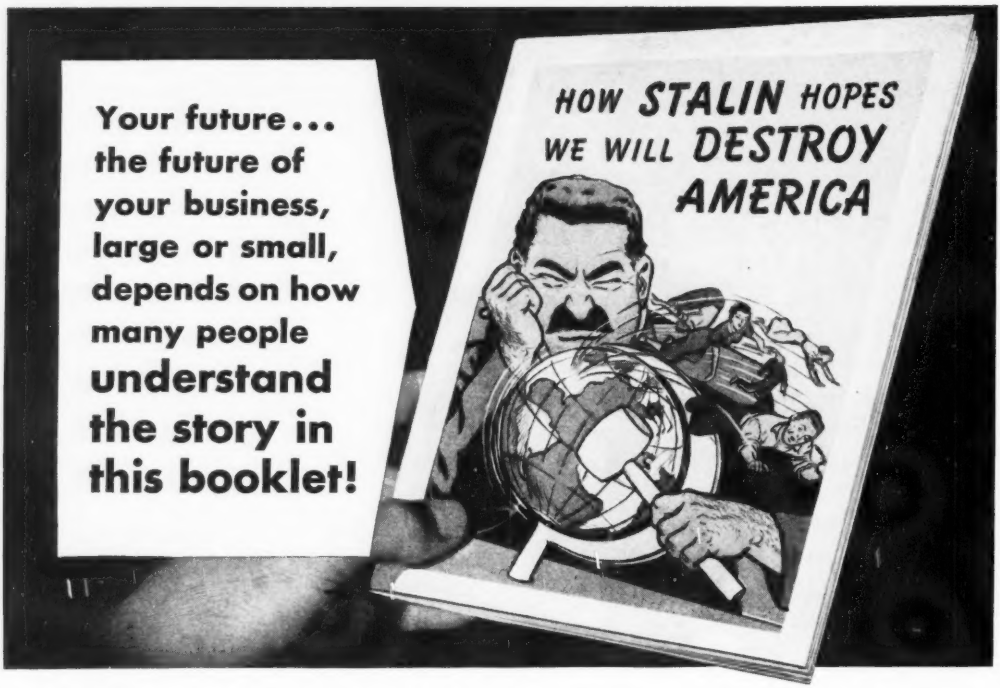
☐ Data Sheet and test results
☐ 5 Gal. (at drum price)
☐ Hand use
☐ ___machine
☐ ___Drums (55 gal)
☐ Hand use
☐ ___machine

NAME _____
FIRM _____
POSITION _____
ADDRESS _____
CITY _____ STATE _____

Findley's INDUSTRIAL ADHESIVES exclusively

THE F. G. FINDLEY COMPANY • W. PEMBERTON AVE. • MILWAUKEE 45, WIS.

There IS something YOU can do ABOUT INFLATION!


Your future... the future of your business, large or small, depends on how many people understand the story in this booklet!
HOW STALIN HOPES WE WILL DESTROY AMERICA

Businessmen recognize ***inflation*** *as the nation's greatest single threat. But most of us have felt "What can one man—even one business—do to stop it?"*
But there is a way—if enough of us work at it. We can help more people . . . the men and women who work and vote and pay taxes . . . to understand the nature of inflation, its ***causes*** *and* ***cures****. Then we will have gone a long way toward eliminating this pending catastrophe.*

ONE TOOL YOU CAN USE: To help us give our own Bemis workers the inflation picture, we used the colorful, new 16-page booklet "How Stalin Hopes We Will Destroy America" produced by Pictorial Media, Inc. The more widely the booklet is used, the more good it will do . . . and it is available for distribution to your workers, too. It follows the time-proven "comic book" technique . . . dramatizes the dangers . . . and shows how all our citizens can help halt inflation before it's too late.

TESTS SHOW IT HELPS WORKERS: To get an impartial judgment of the value of "How Stalin Hopes We Will Destroy America," it was tested in Bemis plants by the Psychological Corporation under the direction of Dr. Henry C. Link, a foremost research authority. Dr. Link says "Those workers exposed to the booklet were found to have a significantly higher appreciation of the recommended ways to stop inflation than did the workers who did not see the booklet. Details of this test are available upon request." And Bemis factory workers make such statements as "Everything it says hit home, but you'd never figure it out for yourself until you read it". . . ."It's told in an interesting way so anyone can understand. My daughter, age ten, understood all of it"..."In picture form it impresses you more. Most people don't read about it"..."Had ideas that we wouldn't think about otherwise while we are working away—good book, agree with it—I guess I won't be the only one."

Because we believe this message is growing more urgent every day, Bemis is taking this means to commend to other businesses this weapon against inflation. It is the first of a series of such material that we expect to use.

BEMIS BRO. BAG CO.
St. Louis 2, Missouri

FOR EVERY BUSINESS, LARGE OR SMALL: In quantities, it costs only a few cents a copy—$10.00 for 100 copies, down to 3 cents per copy in larger quantities. Single copy free. For full information, write PICTORIAL MEDIA, INC., Attention: Paul Wheeler, 205 E. 42nd ST., NEW YORK 17, N.Y.

no ONE chain serves every purpose

This Link-Belt universal crescent flat-top chain travels around vertical curves, as well as the sharp horizontal bends shown here. Jars take this irregular path, each always riding separately on its own chain top plate.

LINK-BELT offers the RIGHT chain for every job . . . engineered to meet your requirements

Typical conveyor chains from the complete Link-Belt line

S-815 flat top conveyor chain—economical, sturdy, reliable, easy to detach and to keep clean.

Class 400 swivel chain—carries cartons, cases, etc. over paths with both vertical and horizontal turns.

Class RC flat top chain—precision made for smoothest, spill-free carrying and long life.

Class RC crescent flat top chain—travels in horizontal planes, around corners; ideal for bottles and cans.

Link-Belt offers no single "cure-all" chain to handle every job. From the most complete line of chains and sprockets in the world—we can recommend the *exact* type to fit your particular job requirements—cast, combination, forged and fabricated steel, roller or silent for conveying and power transmission service. So, whatever your chain problems, big or small, Link-Belt engineers will work with you or your consultants to help solve them.

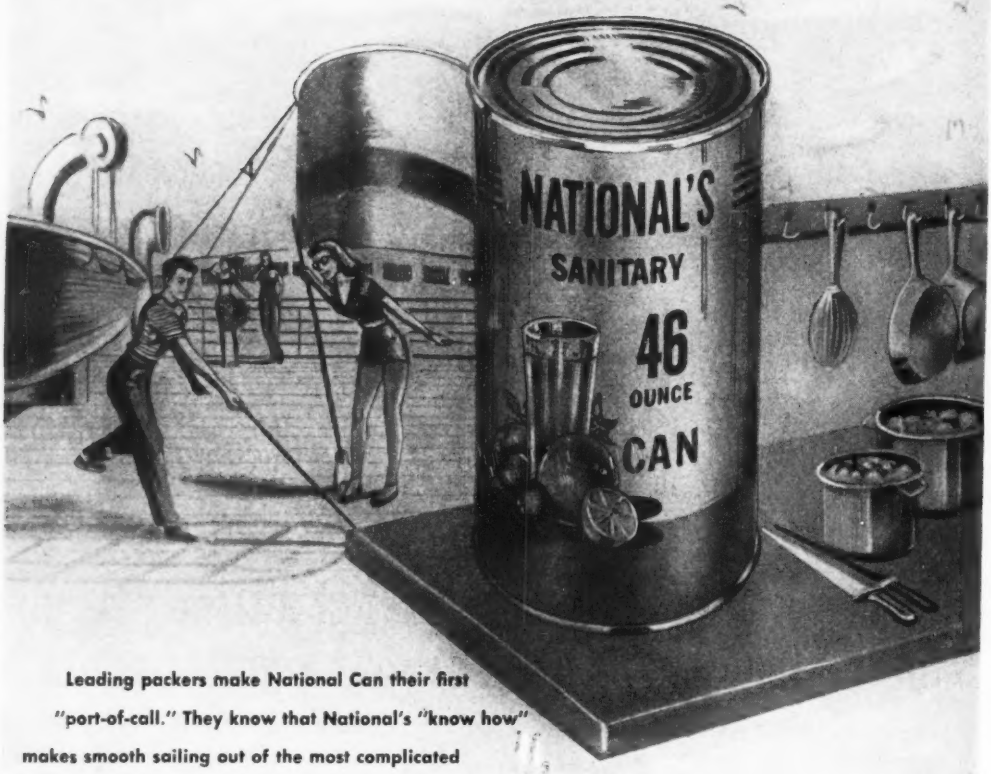
LINK-BELT COMPANY, Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities. 12,208-N

LINK-BELT

CHAINS AND SPROCKETS

NATIONAL CANS

Going Places---



Leading packers make National Can their first "port-of-call." They know that National's "know how" makes smooth sailing out of the most complicated production problems. For consistent performance—for superior construction—for truly stabilized interior linings . . . steer your course to National Can. If you're looking for a lifesaver—why not call or write today— we'll help you keep your products "going places."

50 YEARS OF SERVICE
NATIONAL CAN CORPORATION
1901 • 1951

NATIONAL CAN CORPORATION

110 EAST 42nd STREET, NEW YORK 17, N.Y.

The name . . .

is *Domino*

Another famous brand packaged by PNEUMATIC

Yes, it's DOMINO — but it could have been any one of more than a dozen leading brands of sugar. For, as you possibly may *not* know, most famous "sweetenings" are packaged the same way — by Pneumatic machines.

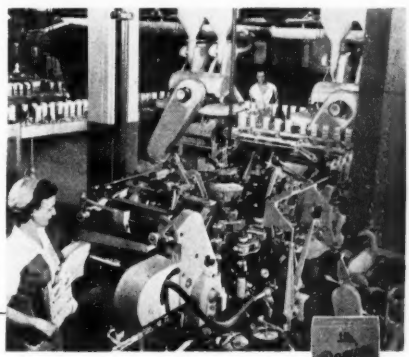
American Sugar, like many other merchandisers of perishable products, uses Pneumatic's Double Package Maker Combination. This equipment produces a package within a package, an inner lining sealed separately from the carton shell.

Their use of this Pneumatic equipment gives American Sugar maximum product protection and package convenience. Equally important, it gives them the "lower cost per container" performance that has made Pneumatic the most economical packaging equipment to operate and own, regardless of initial cost.

PNEUMATIC SCALE CORP., LTD., 91 Newport Avenue, Quincy 71, Mass.
Also: New York; Chicago; San Francisco; Los Angeles; Seattle; Leeds, England.

OTHER SUGAR BRANDS PACKAGED ON PNEUMATIC MACHINES

REVERE	C & H	JACK FROST	HOLLY
DIXIE CRYSTALS	SPRECKELS	McCAHAN	ROYAL ACADIA
GODCHAUX	IMPERIAL	QUAKER	ST. LAWRENCE
GREAT WESTERN	REDPATH	COLONIAL	WHITE SATIN
LANTIC			BRITISH COLUMBIA



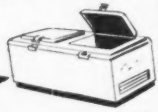
Installation of Pneumatic package making and weighing equipment at Domino's modern Sugar Refinery at Baltimore, Maryland.

PNEUMATIC
LOWER COST PER CONTAINER

PACKAGING AND BOTTLING MACHINERY

For frozen foods, you need the right kind of "cooler."

this



not this

Same way with trucks. Get one that fits the job!

Dependable DODGE TRUCKS are "Job-Rated" to slash costs

Are high hauling costs nipping your profits? Then switch to trucks that fit your job—Dodge "*Job-Rated*" trucks.

With new Dodge "*Job-Rated*" trucks, you haul bigger payloads. You haul faster, too. You get new power to cut down your time on the road—economical power to save on gas and oil. And you get improved visibility and new handling ease for more speed through traffic.

What's more, thanks to new lower loading heights, you spend less time at each stop. And with famous Dodge *dependability*, you get a truck that will save you money for years to come.

Find out how much you can save in operating and upkeep costs with a Dodge "*Job-Rated*" truck that's at home on your job. See your nearby Dodge dealer today.

"Job-Rated" TRUCKS DO THE MOST FOR YOU

How Dodge trucks are "*Job-Rated*" for hauling foods

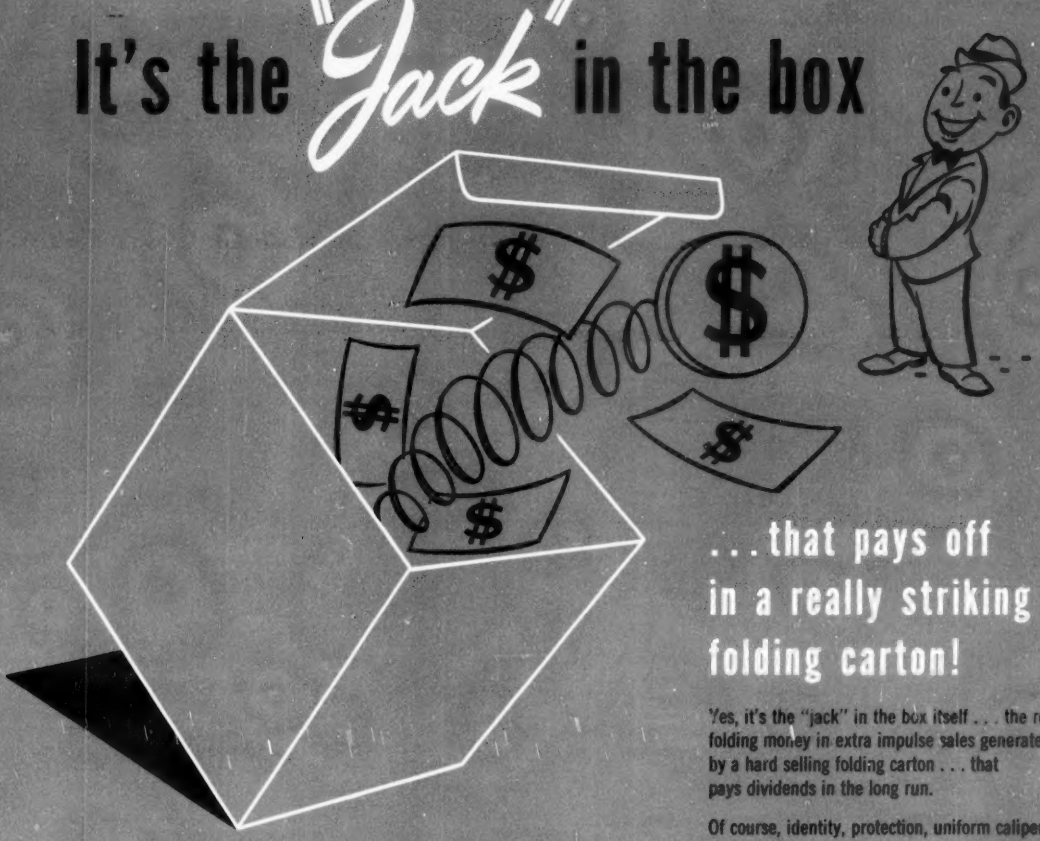
A Dodge "*Job-Rated*" truck is engineered *at the factory* to fit a specific job . . . save you money . . . last longer.

Every unit from engine to rear axle is "*Job-Rated*"—factory-engineered to haul a specific load over the roads you travel and at the speeds you require.

Every unit that SUPPORTS the load—frame, axles, springs, wheels, tires, and others—is engineered right to provide the strength and capacity needed.

Every unit that MOVES the load—engine, clutch, transmission, propeller shaft, rear axle, and others—is engineered right to meet a particular operating condition.

It's the "Jack" in the box



. . . that pays off in a really striking folding carton!

Yes, it's the "jack" in the box itself . . . the real folding money in extra impulse sales generated by a hard selling folding carton . . . that pays dividends in the long run.

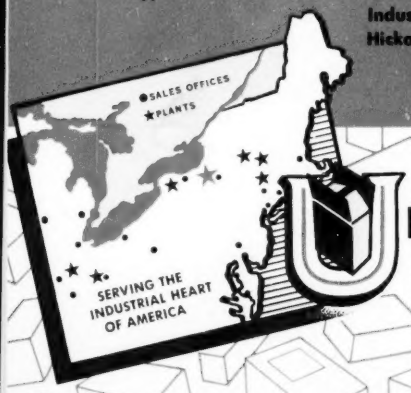
Of course, identity, protection, uniform caliper for uniformly brilliant printing, and dimensional stability for smooth flow through high-speed automatic filling machines are all important.

But what the customer sees . . . the quality that matters at the point of sale . . . is the drama, the eye appeal, the selling sense.

United Board & Carton has trained specialists in all phases of folding carton production to consult with you, create for you, or produce the carton you have created for yourself. Just ask a United Board & Carton man to call. No cost. No obligation.

A few of the nationally famous companies who use United Board & Carton services

Swift & Company
Alfred Nichols Bakery
Enterprise Mfg. Co.
U. S. Gypsum
Lily Tulip Cup Corp.
The Kroger Co.
The Coca-Cola Co.
General Motors Corp.
Industrial Tape Corp.
Hickok Manufacturing Co.



UNITED BOARD & CARTON CORPORATION

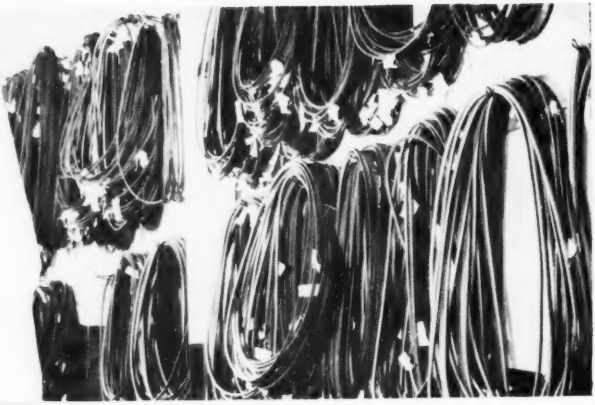
156 SOLAR ST., SYRACUSE, N. Y.

Carton Plants: SYRACUSE, VICTORY MILLS, COHOES, N. Y., SPRINGFIELD, O.

Board Mills: LOCKPORT, THOMSON, N. Y., URBANA, O.

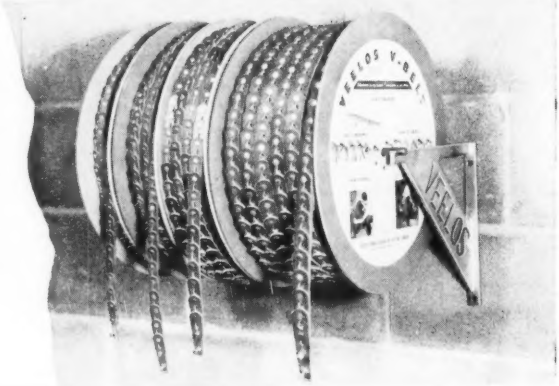
Why carry this Costly Inventory?

When you switch to Veelos—the adjustable v-belt—you end for all time the storage problem, the inventory control problem and the "frozen investment" problem that come with carrying this expensive, space-wasting stock of endless v-belts.



4 reels of *VEELOS* is your Complete Inventory

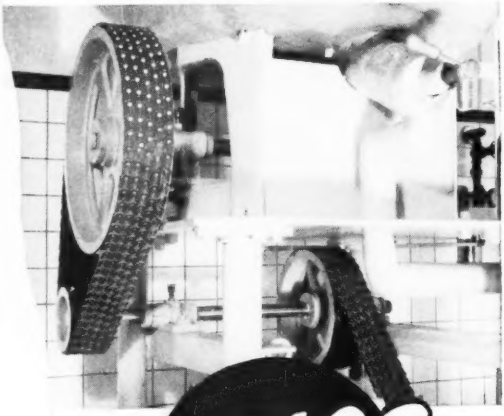
With just these 4 reels of Veelos you can take care of *every* v-belt need in the O, A, B and C widths—these 4 reels replace up to 316 sizes of endless v-belts . . . and you have the right size belt when you need it. There's no storage or control problem—inventory costs are at a minimum.



and *VEELOS* provides Peak Machine Production

Vibrationless, full power delivery—simple, easy adjustment to maintain uniform tension on all belts—quick installation (unnecessary even to dismantle outboard bearings) these are Veelos advantages that mean maximum production.

We have a copy of the **VEELOS DATA BOOK** for you—write today and we'll send you this complete story on Veelos—the adjustable v-belt.

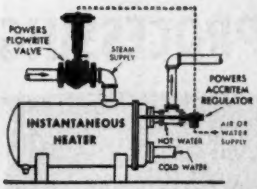


VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

MANHEIM MANUFACTURING & BELTING COMPANY • MANHEIM, PENNA.



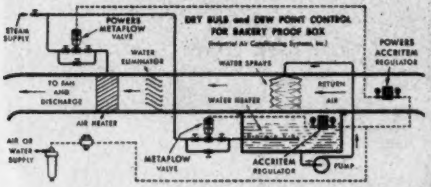
POWERS

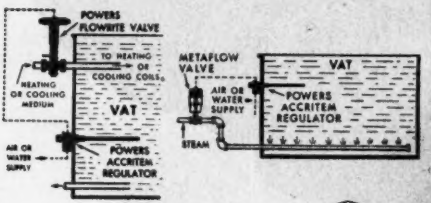
ACCRITEM REGULATOR

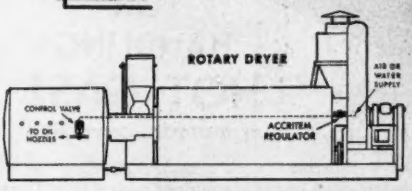
Easy to adjust

Compressed air or water operated

Only a few of many uses







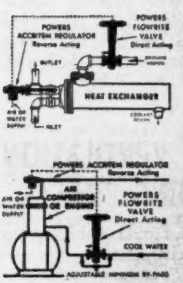
Gives

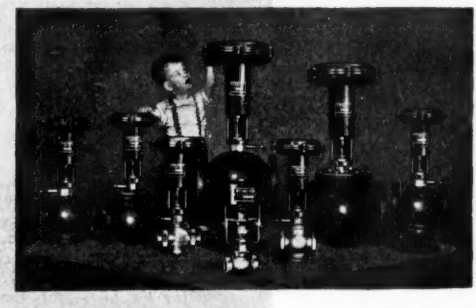
Accurate, Low Cost Heat Control

Use Accritem Regulators to control diaphragm operated valves or dampers. They save labor, stop losses caused by over-heating and have the following—

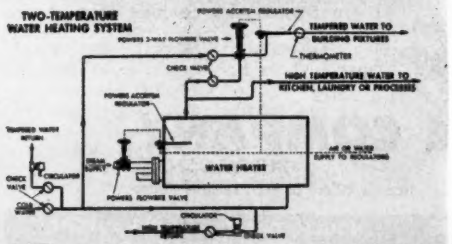
IMPORTANT ADVANTAGES

- ***Adjustable Sensitivity*** and over-heat protection.
- ***Calibrated Dial*** temperature adjustment.
- ***Simple, Rugged Construction*** withstands vibration and insures many years of reliable service.
- ***Temperature Ranges*** 50 to 250° F. and 150 to 350° F.
- ***Easy to Install*** Requires 15 lb. supply of compressed air or water for its operation.
- ***Small Size***—regulator head is only 2⅞" x 3⅝", sensitive bulb is 12" long with ½" I.P.S. connection.





FLOWRITE and METAFLOW
Diaphragm Valves
controlled by a POWERS
ACCRITEM HEAT REGULATOR
provide an unbeatable
combination for *better control*
and lower maintenance



Write for Bulletin 316—or phone our nearest office for prices and further information about POWERS ACCRITEM regulators and diaphragm valves.

THE POWERS REGULATOR CO.

OFFICES IN OVER 50 CITIES • See Your Phone Book
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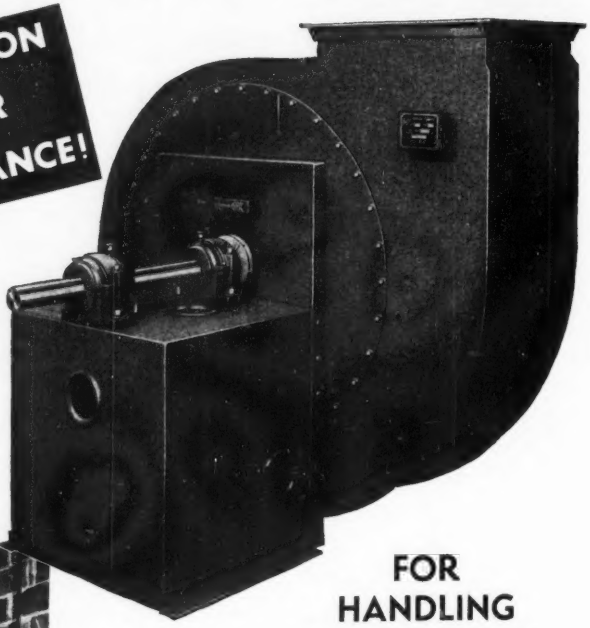
MEXICO, D. F., Apartado 63 Bis.

60 Years of Temperature and Humidity Control

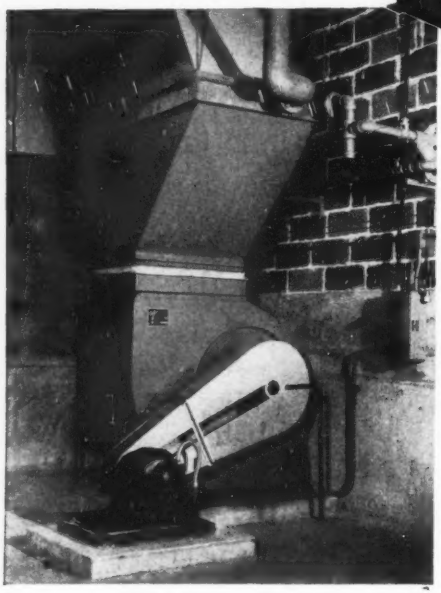
(AMP)

AIR. BASIC TOOL IN FOOD PROCESSING

YOU CAN DEPEND ON "Buffalo" FANS FOR AIR PERFORMANCE!



From simple ventilation to air circulation for quick freezing, air is a valuable tool in every type of food plant! And you'll find "Buffalo" Fans doing these many jobs to complete satisfaction. Here are two examples of "Buffalo" Fans that help make better food—



FOR HANDLING HOT GAS!

(or material conveying)

Above is a well-known "work" fan, the "Buffalo" Industrial Exhauster. This model is equipped with a heat slinger (a small rotor mounted on shaft nearest housing) and is capable of handling gases up to 720 deg. F. Of all-welded rugged steel plate construction, it is effective in a wide variety of exhausting applications—and may be had with interchangeable Material Wheels or Air Wheels. WRITE FOR BULLETIN 3576-B.

FOR THE LARGE VENTILATION AND AIR CONDITIONING JOBS!

At left is a "Buffalo" Limit-Load Fan, famous for its quietness, efficiency and non-overloading characteristic. Processing and packing plants put the "LL" to many profitable uses. *Write us for the facts*—this fan is made in sizes up to 500,000 cfm, to meet most requirements.

"Buffalo" FIRST FOR FANS

BUFFALO FORGE COMPANY

152 MORTIMER ST. BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Branch offices in all Principal Cities

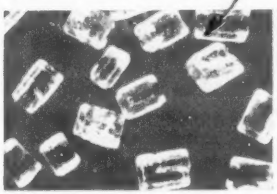
VENTILATING FORCED DRAFT | AIR WASHING COOLING | AIR TEMPERING HEATING | INDUCED DRAFT EXHAUSTING PRESSURE BLOWING

You always get Superior Quality Constant Uniformity with B&A AMMONIUM SULFATE (PURIFIED)

- Continuous quality control insures material extremely low in undesirable heavy metals.
- Available as free-flowing uniform crystals for exacting process use.
- Particularly suited to the manufacture of foods and medicinals.

EXTREMELY LOW IN Pb, Fe, As, Cl, nonvolatile, etc. Compare!

Available as uniform granular crystals.
(crystals enlarged 10 diameters)



FOR:

1 Fermentation processes in manufacture of food products and medicinals

2 Processing blood plasma

3 Treatment of catgut for surgical sutures

PRODUCED IN UNIFORM, free-flowing crystal form from specially selected pure raw materials, B&A purified Ammonium Sulfate constantly assays over 99% minimum $(NH_4)_2SO_4$.

LONG PREFERRED BY manufacturers of food and medicinal products for its superior high quality and uniformity, and low heavy metals content, B&A Ammonium Sulfate is now widely used in the production of medicinals important to public health and national defense.

SUPPLYING TONNAGE quantities of this high purity product is a natural development of Baker & Adamson's 69 years' experience in producing analytical reagents of "decimal point" purity.

FOR Ammonium Sulfate of *superior high quality* and *constant uniformity* . . . to meet the most exacting requirements . . . always specify B&A.

READY FOR DELIVERY stocks are carried at B&A's own distributing stations from coast-to-coast. Any office listed below can handle your order promptly.

REAGENTS
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FINE CHEMICALS

BAKER & ADAMSON *Fine Chemicals*

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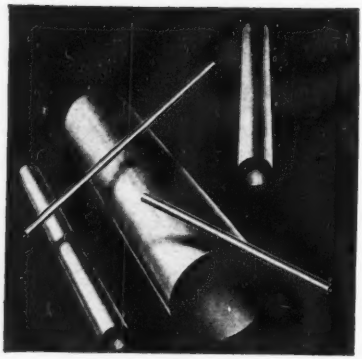
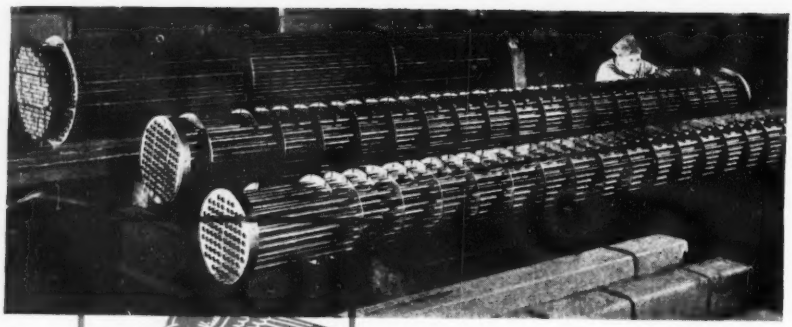
SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

* Complete stocks are carried here.





A. O. SMITH designs with TRENTWELD

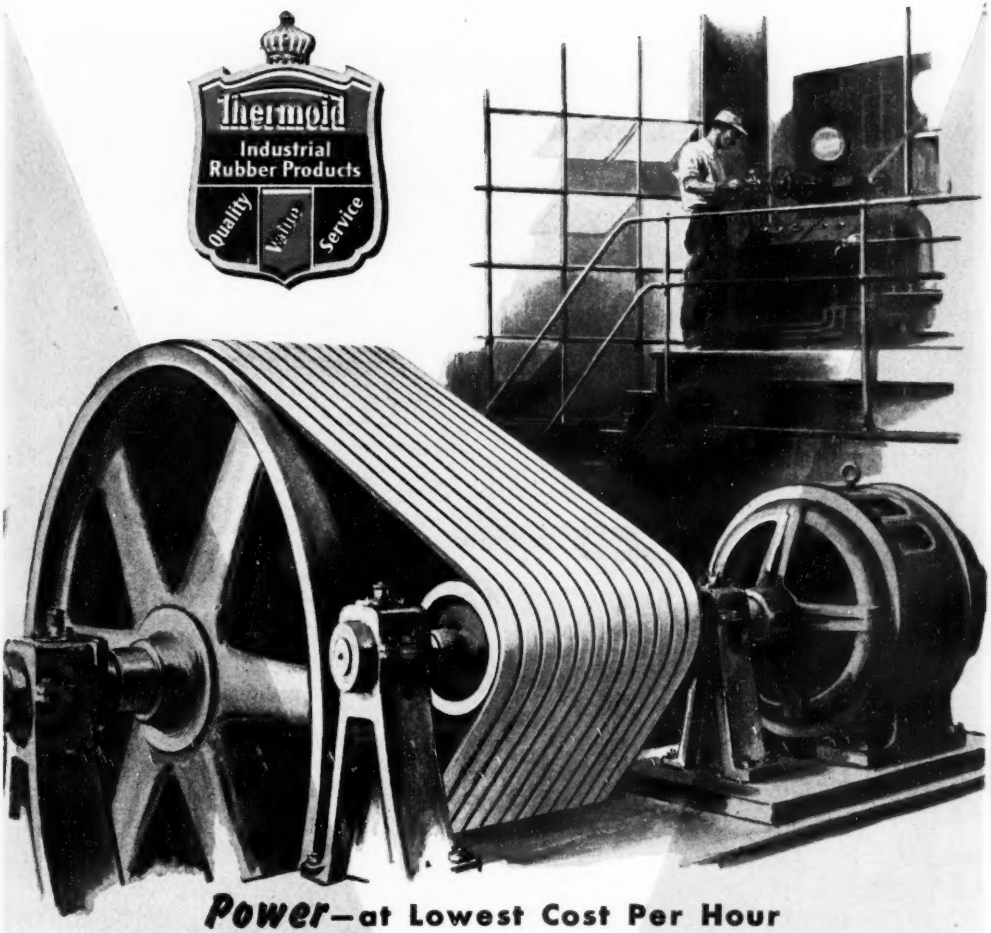
When A. O. Smith, big name in steam and heat transfer equipment recently designed and built a heat exchanger unit for Socony-Vacuum — TRENTWELD Stainless Steel tubing was used throughout. This heat exchanger unit for use in the petroleum industry is another example of how TRENTWELD is preferred by designers for products where stainless steel tubing fits the bill.

And here's why: TRENTWELD is the product of tube specialists. That means you're assured uniform quality and specifications of manufacture that meet your most exacting needs. Then too, TRENTWELD is available in a full range of sizes—⅛" to 36" in diameter, in all grades and finishes. When the job requires stainless steel tubing, check with us.

TRENTWELD STAINLESS STEEL TUBING

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN

(Subsidiary of Crucible Steel Company of America)



Power—at Lowest Cost Per Hour with Thermoid Multi-V Belts

Thermoid Multi-V Belts are pre-stretched to insure maximum power transmission without adjustment. They are constructed for flexibility and ability to absorb repeated shock loads . . . thoroughly impregnated with special rubber compounds to withstand moisture and abrasion, resulting in longer belt life.

Thermoid Multi-V Belts are available in matched sets—uniform in size and cross section. Their longer life and non-slip performance add up to "Power—at the lowest cost per hour."

Your Thermoid Distributor can help you with your power belting problems—whether you need Multi-V, F.H.P. or flat transmission belts. For unusual belt problems, a Thermoid Field Representative is always available to give you the benefit of his experience.

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

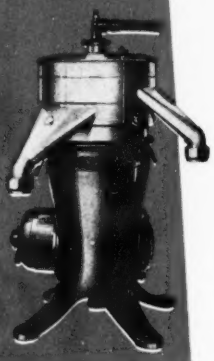
Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

ONE-WAY SEPARATION

Usually called clarification because it involves removing a solid from a liquid, such as removing burnt crumbs from cooking fat, or taking seed and dirt out of tomato puree. For these applications a De Laval Multiple Clarifier is used.

TWO-WAY SEPARATION

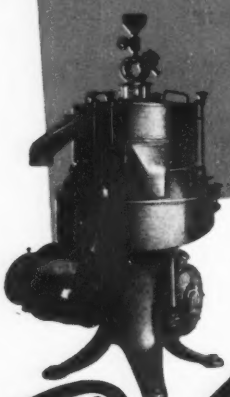
Separating two liquids of different specific gravities, simultaneously removing small quantities of solids (usually less than 0.5%) and storing them in the bowl. Typical applications: skimming grease from chicken broth; polishing olive oil; recovering oil from spoiled mayonnaise. Machine used: De Laval Industrial Separator.



WHICH ONE WILL SPEED UP YOUR FOOD PROCESSING?

THREE-WAY SEPARATION

Continuous separation of two liquids and simultaneous continuous removal of solids from the liquid mixture. Typical applications: separating fish oil from press liquor; citrus oil from fruit juice and pulp. Machine used: De Laval "Nozzle-Matic" Separator.



De Laval offers a *complete line* of centrifugal machines so that you may pick exactly the right one to speed up applications in your plant. They *all* speed up separation and clarification by making these steps continuous, but different types of food separations require different De Laval machines.

THE DE LAVAL SEPARATOR COMPANY
165 Broadway, New York 6 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.

De Laval

CONTINUOUS CENTRIFUGAL SEPARATORS & CLARIFIERS

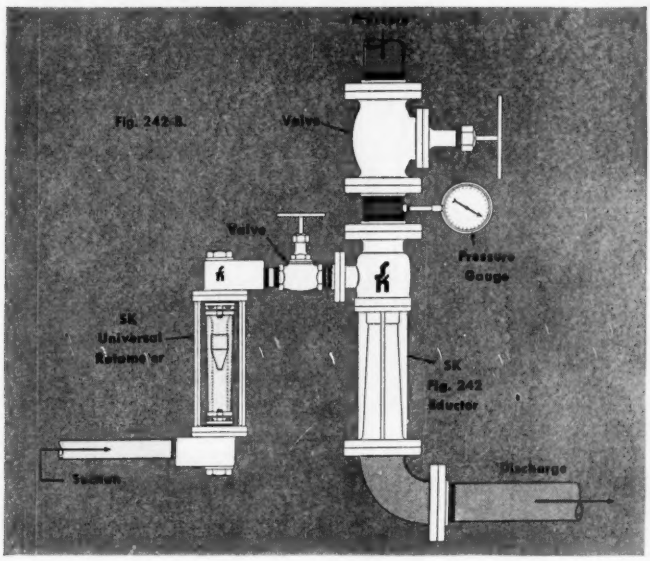
FOR BETTER · FASTER FOOD PROCESSING

TRADE PAPER EDITION
Published by
SCHUTTE and KOERTING Company

ENGINEERING News

JET APPARATUS • HEAT TRANSFER EQUIPMENT • STRAINERS • CONDENSERS AND VACUUM PUMPS • OIL BURNING EQUIPMENT • ROTAMETERS • FLOW STABILIZERS • GAUGES • VALVES • SPRAY NOZZLES AND ATOMIZERS • GEAR PUMPS • DEOXYGENATORS

HERE'S AN EASY WAY TO MEASURE AND MIX LIQUIDS INTO CONTINUOUS STREAMS



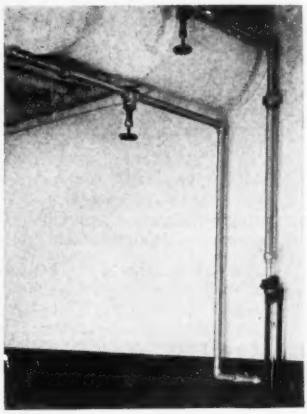
THE system above is simplicity itself. It consists of a SK Rotameter and a SK Jet Eductor. It represents only one of numerous possible variations. With this system, you can mix two liquids in desired proportion in one continuous operation.

Flow of the pressure liquid is controlled by a valve and the orifice of the eductor nozzle. The pressure liquid passes through the eductor nozzle with sufficient velocity to draw in and entrain the suction liquid. Rate of flow of the suction liquid is measured by the Rotameter and controlled by a valve in the suction line. Both liquids are intimately mixed within the eductor to a degree not obtainable with most other types of mixing apparatus and are discharged through the discharge line. The mixing ratio remains constant as long as the pressures are held constant.

Of importance is the fact that the eductor has no moving parts—the Rotameter but one, the rotor. Maintenance, therefore, is low. Operation is consistently efficient. In addition, the eductor can be made of special materials to handle corrosive liquids.

The system is flexible. Additional liquids can be mixed by extending the system. SK Controlling Rotameters can be used in pressure and suction lines to proportion flows under changing conditions.

The SK Rotameter illustrated is a stock item, immediately available. SK Jet Eductors are built to meet job requirements. For details on the many types of Jet Eductors, request Bulletin 2-M. For information on all types of Rotameters, request Bulletin 18-RA. We'll send you either or both, promptly.



FOR METERING FLOW IN BIG PIPE LINES

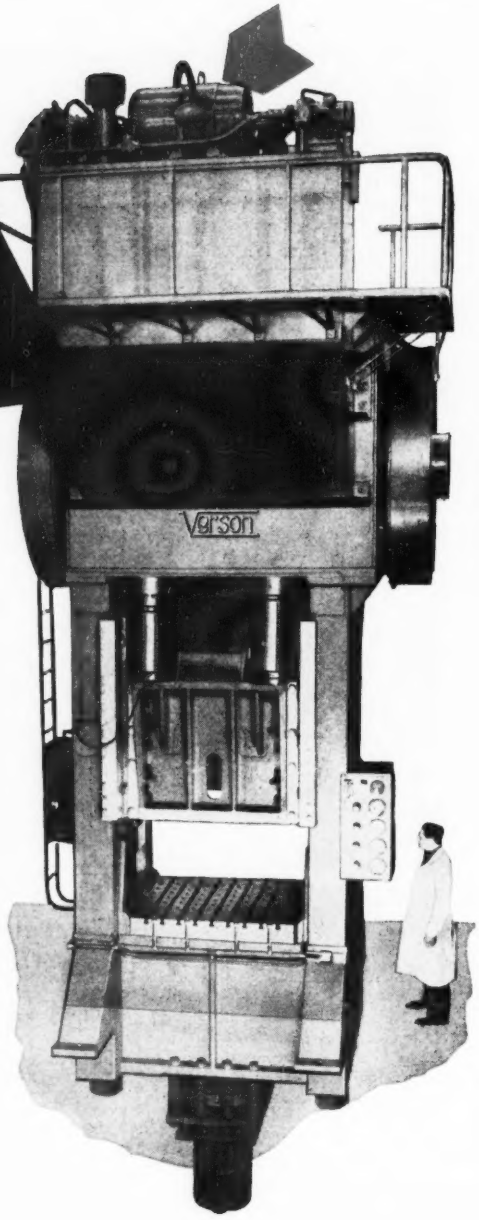
SK Bypass Rotameters are designed for metering the flow rate of liquids or gases in pipes larger than 3" in diameter where through flow Rotameters would be less practical.

These Bypass Rotameters are so installed that a definite ratio is provided between the flow rate in the main pipe and that in the bypass pipe. Since bypass flow is directly proportional to main flow, the Rotameter can be calibrated to read main flow directly.

The Rotameter illustrated is one of two being used by Penn Mutual Life Insurance Company, Philadelphia, Pa.

SCHUTTE and KOERTING Company
Manufacturing Engineers
25 CORNWELLS HEIGHTS
BUCKS COUNTY, PA.
Representatives in Principal Cities

Machine with a POWERHOUSE PUNCH!



In one mighty blow, this giant 850-ton, double-action, deep-drawing Verson Allsteel press forms an intricate automobile part.

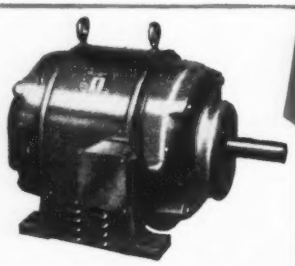
Multiply this by seven strokes a minute, 3 shifts a day, seven days a week and you have a rugged operating schedule . . . one which the Howell motors that power this fine press take right in stride.

Howell engineers worked closely with this manufacturer to select the *right* motor for each job. The main drive motor is a Howell 50 H.P. high slip, high torque motor designed specially for punch press work. The self-adjusting blankholder is driven by a hydraulic pump, powered by a 50 H.P. Howell motor. A 20 H.P. Howell motor operates another hydraulic drive.

Howell will devote the same care and attention to your electric motor problems and needs. With this cooperation and Howell quality, you're assured of motors that will stand up under the heaviest production load over long periods without interruption.

May we help you?

HOWELL ELECTRIC MOTORS COMPANY
Howell, Michigan

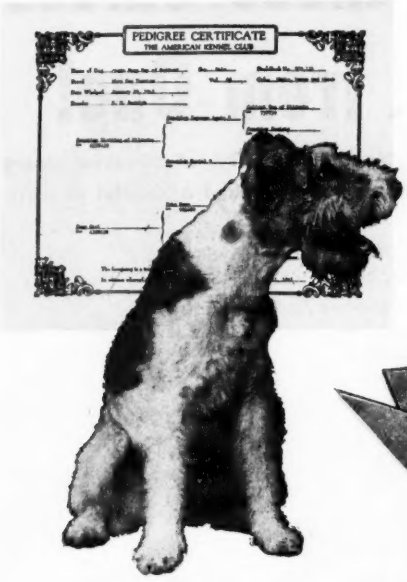


Howell Type F Motor. A high slip, high torque motor designed for punching and shearing operations. Sizes ½ to 200 H.P. in open frames; ½ to 125 H.P. in enclosed frames.

HOWELL Red Band MOTORS

HOWELL MOTORS
HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.
Precision-built industrial motors since 1915

THE WIRE-HAIRED FOX TERRIER came from England where it was once used by hunters in routing foxes from their hiding places. Lively, affectionate, and quick to learn, the Fox Terrier has been a very popular dog for many years.



A Pedigree is Fine but when it pays off It's Important!

LIKE purebred dogs, Union corrugated containers have a pedigree—an unbroken line of control going all the way back to Union-owned forests and mills.

But the important thing is that this pedigree *pays off* to users of Union boxes. Pays off in uniform quality, less breakage, and fewer returns.

That's because Union specifies and controls every step in manufacture. You can be sure that every carload of Union boxes measures up to the same standard of samples submitted or of previous orders.

The Sweets Company of America knows the importance of this, and ships its famous Tootsie Rolls to all America in Union corrugated boxes.

Dependable Packaging Since 1872

UNION Corrugated Containers

UNION BAG & Paper Corporation

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

***Corrugated Container Plants:* SAVANNAH, GEORGIA • CHICAGO, ILLINOIS • TRENTON, NEW JERSEY**

All these Valves . . from One!

Valve combinations for 90% of industrial piping assembled with 4 bodies and a handful of parts.

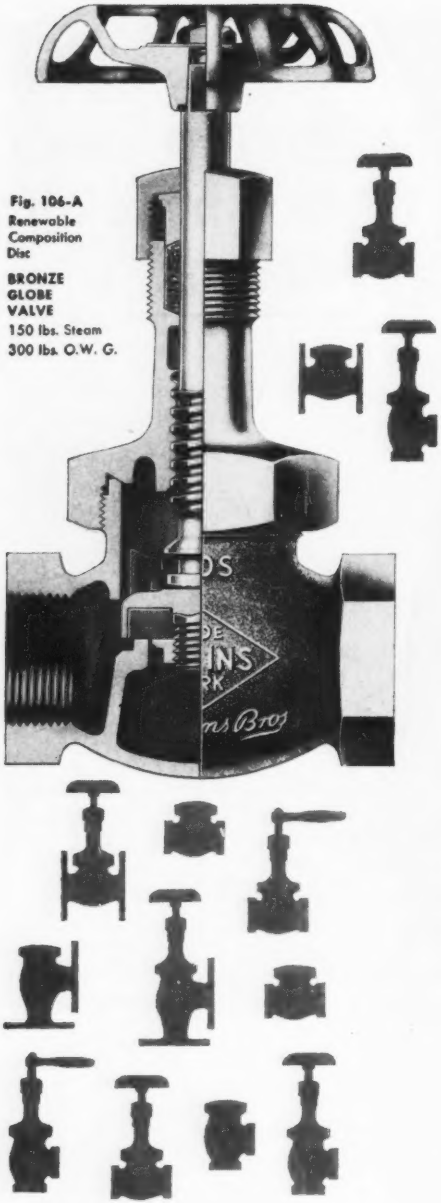
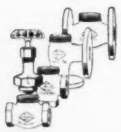


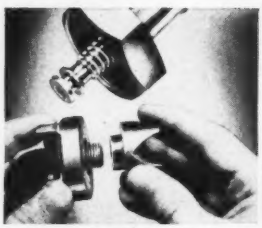
Fig. 106-A
Renewable Composition Disc

BRONZE GLOBE VALVE
150 lbs. Steam
300 lbs. O.W. G.

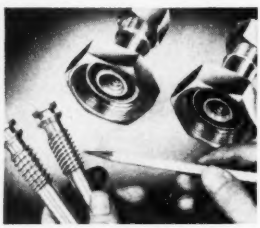
JENKINS FIG. 106-A "FAMILY"

Start with the standard Fig. 106-A. Trimming is interchangeable in Globe or Angle body, screwed or flanged.

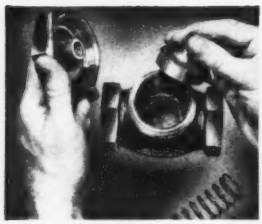




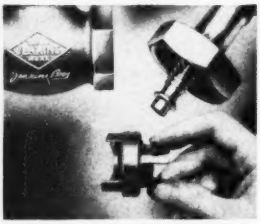
For Close Control — In throttling service, the nut which holds the disc in the disc holder is removed and replaced with Throttling Nut, Fig. 344.



For Quick Opening and Closing — Merely substitute the bonnet and spindle from Fig. 941, in which threads are pitched more sharply.



For Lift Check Service — Globe or Angle Bodies can be fitted with interchangeable Cap, Disc Holder, and Guide Disc Nut from Fig. 117A. Addition of spring from Fig. 655A provides spring loaded service.



For Stop & Check Service — Use the 106A trim, but substitute this spindle from Fig. 630A and replace the regular disc nut with the check valve guide disc nut.

Look over these pictures and see how easy it is to make up just the valve type you need, simply by interchanging parts. Think of the saving this means in maintenance expense . . . in reduced inventory of spare valves in your stockroom.

That's a big reason why the Fig. 106-A series takes top honors in any poll for valve preference. And Jenkins time-proved design, makes them the longest-lasting, lowest-upkeep valves that money can buy.

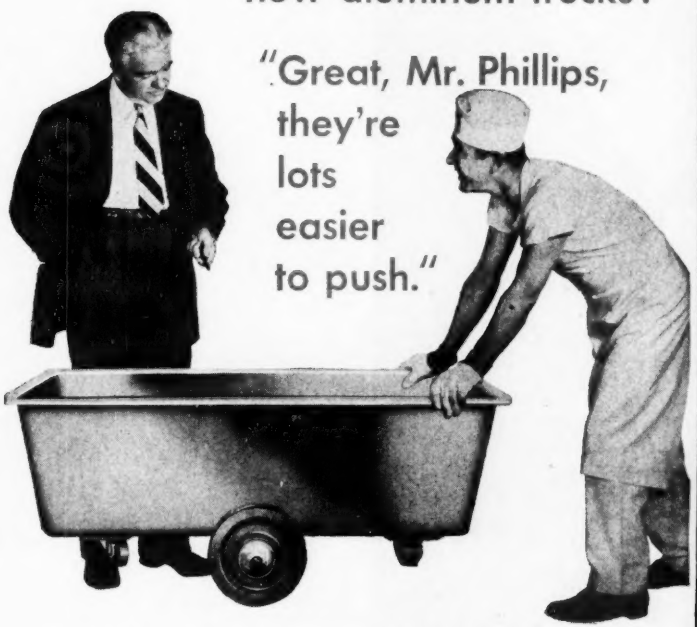
For example, see the heavy construction of the one-piece, screw-over bonnet. You can remove and replace it over and over again without distortion. See the extra size packing box,—and the perfectly machined threads on the heavy manganese bronze spindle, with more threads in contact with the bonnet, open or closed.

Remember, Jenkins Bros. is the originator of the renewable composition disc valve,—the *only* manufacturer of both valves *and* discs. For drop-tight, trouble-free performance, get acquainted with the Fig. 106-A "family". Despite their extra value, *you pay no more* for Jenkins Valves. Jenkins Bros., 100 Park Ave., New York 17, N. Y. Jenkins Bros., Ltd., Montreal. Sold through leading Industrial Distributors.

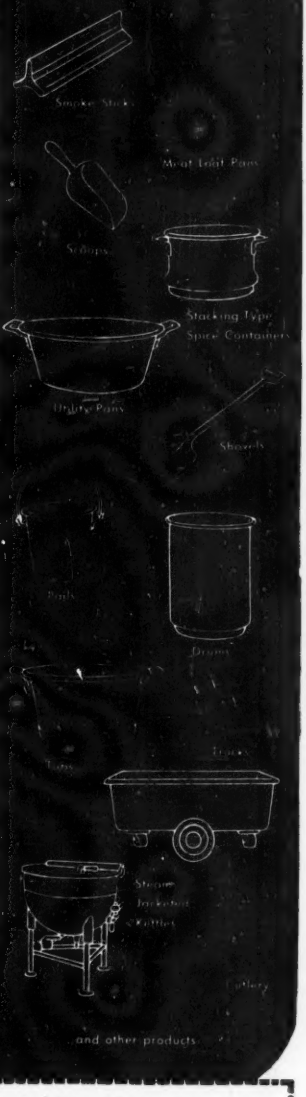
JENKINS VALVES

"How do you like these new aluminum trucks?"

"Great, Mr. Phillips, they're lots easier to push."



WEAR-EVER ALUMINUM EQUIPMENT FOR FOOD PLANTS



Yes sir, employees go for Wear-Ever Aluminum equipment in a big way. Fellows whose muscles do the heavy work in your plant find that light-to-handle aluminum makes their daily work easier. They're enthusiastic about it.

You'll be enthusiastic, too, at the way Wear-Ever Aluminum equipment cuts replacement costs. It's made of an extra-hard aluminum alloy that has almost twice the tensile strength of the type commonly used. That means it withstands denting and gouging—and gives EXTRA service. Remember, too, that only Wear-Ever uses this super-tough aluminum alloy in the manufacture of food plant equipment.

For full details about Wear-Ever hard-alloy aluminum equipment for your plant, mail the coupon today.

WEAR-EVER Aluminum

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

Standard of Quality for more than 50 years

The Aluminum Cooking Utensil Company
308 Wear-Ever Building, New Kensington, Pa.

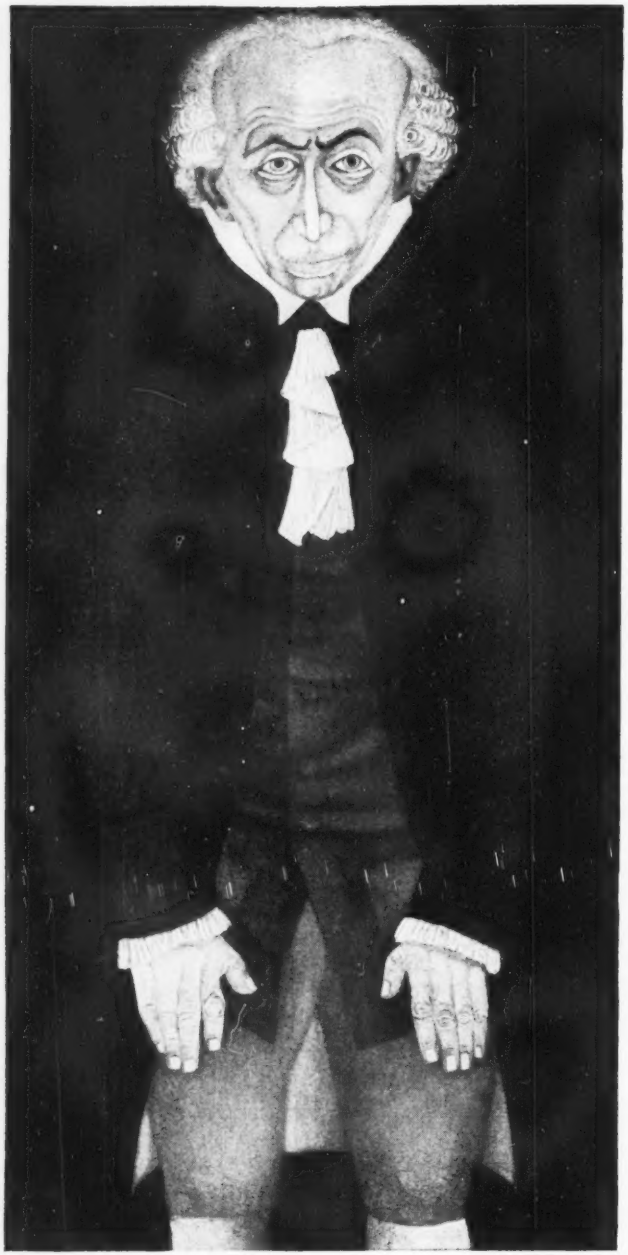
Please send me full details about your line of sanitary, hard-alloy aluminum trucks and other food plant equipment.

NAME .....

ADDRESS .....

Fill in, clip to your letterhead, and mail

ARTIST: RICHARD LINDNER



GREAT IDEAS OF WESTERN MAN
. . . ONE OF A SERIES

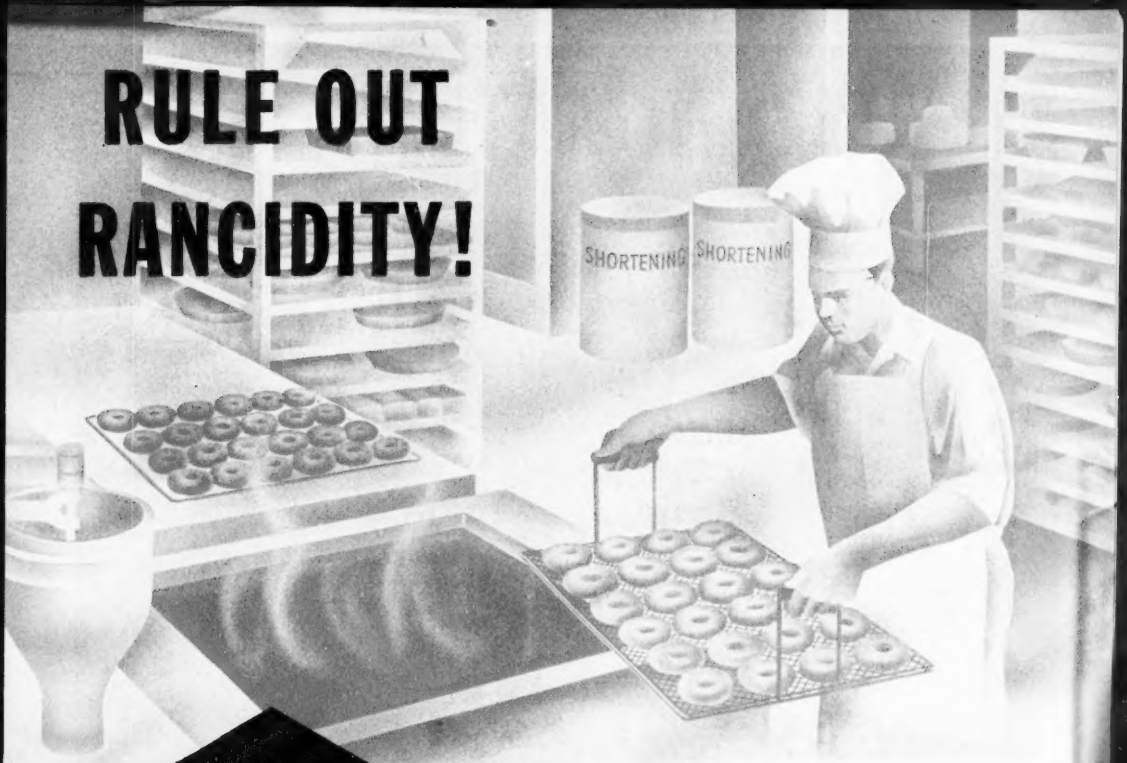
Immanuel Kant

Two things fill the mind with ever new and increasing admiration and awe, the oftener and the more steadily we reflect on them: *the starry heavens above and the moral law within.*

Critique of Practical Reason, 1788

CONTAINER CORPORATION OF AMERICA

RULE OUT RANCIDITY!



Heyden

PROPYL GALLATE

antioxidant & stabilizer

Bakers and other users of shortenings know that freshness and sweetness must be safeguarded until the last bit is used. This is no less true of other materials that may turn rancid.

Protection against rancidity in oils and fats is easily secured with Heyden Propyl Gallate. Effective in low concentrations, this powerful antioxidant prolongs shelf-life and stabilizes color, odor and taste.

Propyl Gallate is a neutral, white powder approved by the Bureau of Animal Industry for use in animal fats. It also prevents auto-oxidation in waxes, ethers, emulsions and kindred products.

• • •

Heyden Propyl Gallate is shipped in 200, 100, 50 and 25 lb. fiber drums. Technical literature and samples will be forwarded promptly upon request.

FINE HEYDEN CHEMICALS

Serving Industry Through Finer Chemicals

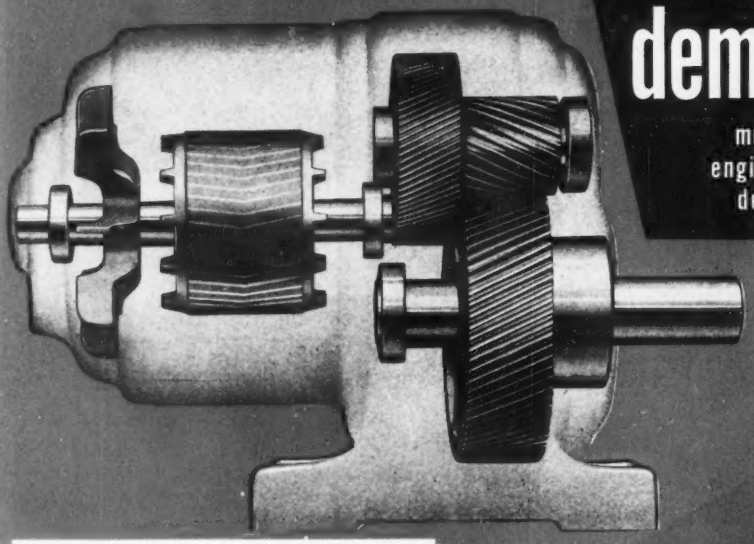
Benzaldehyde • Benzoates • Benzyl Chloride • Bromides
Chlorinated Aromatics • Creosotes • Formaldehyde • Formic Acid
Glycerophosphates • Guaiacols • Hexamethylenetetramine
Medicinal Colloids • Methylene Disalicylic Acid
Paraformaldehyde • Parahydroxybenzoates
Penicillin • Pentaerythritols • Propyl Gallate • Resorcinol
Salicylates • Salicylic Acid • Streptomycin

HEYDEN
CHEMICAL CORPORATION
393 Seventh Avenue, New York 1, N. Y.
CHICAGO • PHILADELPHIA • SAN FRANCISCO • DETROIT • PROVIDENCE

power modernization

demands

modern engineering design



OUTSTANDING FEATURES

Simplified gear system—balanced design—compact—rugged—heavy overhung loads—highly efficient—abundant lubrication—low output shaft—Herringbone Rotor—positive oil seals—protected—streamlined—through ventilation—quiet operation—AGMA speeds—long life—every unit will operate in any position.

Ask for your copy of pictorial bulletin No. F-60, showing Sterling Electric Power Drives Turning The Wheels of Industry.

STERLING SLO-SPEED

. . . GIVES YOU THE ONE BEST SLOW SPEED AND

gives uninterrupted service—provides versatile mounting and flexibility in arrangement of machinery—saves valuable space—provides greater safety—costs less to install and use. An indispensable source of slow speed power for:

Agitators	Dryers	Presses
Blenders	Feeders	Pumps
Blowers	Kilns	Screens
Conveyors	Mills	Tumblers
Cookers	Mixers	Etc., etc., etc.

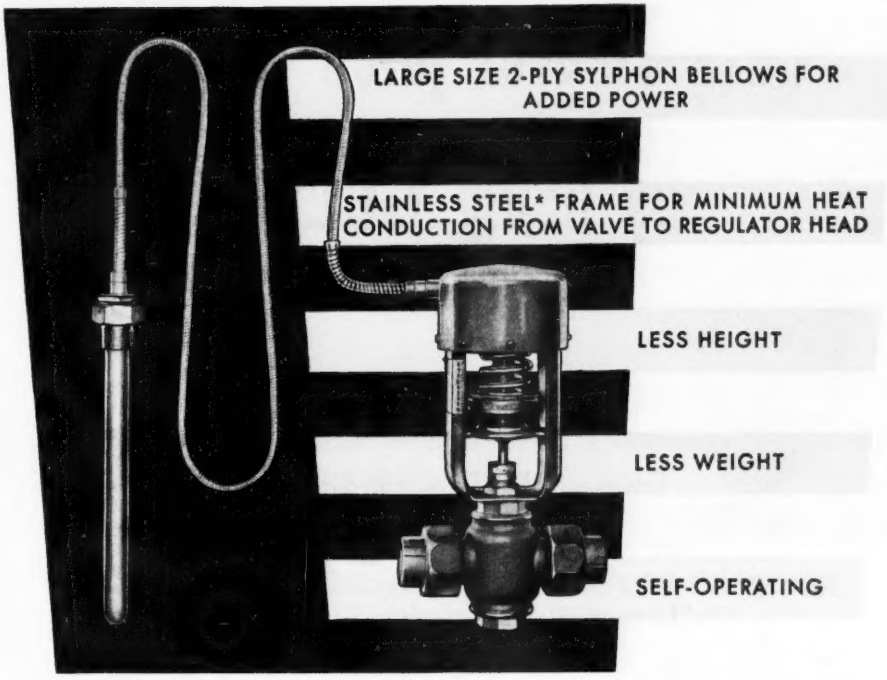
STERLING ELECTRIC MOTORS

Plants: New York 51, N. Y.; Los Angeles 22, California; Hamilton, Canada; Santiago, Chile.

Offices and distributors in all principal cities.

SYLPHON CONTROLS FOR DEPENDABILITY

SYLPHON No. 999


LARGE SIZE 2-PLY SYLPHON BELLOWS FOR ADDED POWER
STAINLESS STEEL* FRAME FOR MINIMUM HEAT CONDUCTION FROM VALVE TO REGULATOR HEAD
LESS HEIGHT
LESS WEIGHT
SELF-OPERATING

New, more powerful, more compact temperature regulator!

For all industrial processes requiring accurate temperature control, this new Sylphon regulator does the job better than ever! It is particularly suited for storage water heaters . . . metal plating tanks . . . bottle washers . . . treaters . . . slashers, etc.

It requires no compressed air or other auxiliary power source. It's simply and sturdily constructed, ideal as standard equipment.

Its new features give added assurance of uniform processing conditions, better performing equipment. Wasteful over-heating is prevented, fuel saved.

No. 999 is also available with fin type bulb for controlling temperature of air and gases. No. 999-A has over temperature protection; No. 999-T is equipped with dial indicating thermometer. Write today for complete details. Ask for Catalog PGA.

*Contingent upon materials availability.

FIRST WITH BELLOWS

Temperature Controls • Bellows Devices • Bellows Assemblies

FULTON SYLPHON
DIVISION

ROBERTSHAW-FULTON CONTROLS CO., KNOXVILLE 4, TENN.

Canadian Representatives, Darling Brothers, Montreal

"Gets clearer juice from press by using CELITE"

From a CELITE Field Engineer's report on jelly making

"IT TOOK only one trial run to convince this customer that he had a lot to gain by using Celite* Pressing Aids in making jelly from frozen grapes. Judging from the clarity of the jelly when Celite was used—a considerably longer storage life could be expected. And because of this clarity, the jelly had far more sales appeal."

• • •

Unusual clarity is one of several economic advantages that are causing more and more fruit processors to use Celite Pressing Aids. Faster production, clearer juice, higher yields, less wear and tear on cloths and equipment are some of the important benefits obtained when these diatomite powders are added in small amounts to the pulp before pressing.

HOW CELITE PRESSING AIDS WORK

The tiny Celite particles, open and porous in structure, interpose themselves between the particles of solid pulp matter. This opens up countless minute channels through which the juice can escape, freely and at lower pressure. More juice is thus extracted in less time. The drier cake is more easily removed and the cloths can usually be re-used without washing.

Celite Pressing Aids are used with practically all types of fruit products. No special equipment is needed and the benefits they assure will usually more than pay for the small amounts of powder required.

IF YOU FILTER

Celite Filter Aids can bring you corresponding benefits in faster production, sparklingly clear juices, longer filtration cycles. They are available in 9 grades of particle fineness, each designed for a specific filtering requirement. A Celite Engineer will be glad to give you all the facts.

*Reg. U. S. Pat. Off.

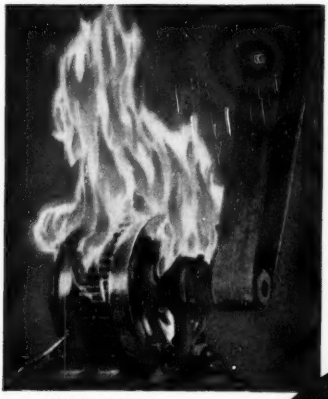
For further information, write Johns-Manville, Box 290, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville CELITE

PRESSING AND FILTER AIDS

ASBESTOS CANNOT CARBONIZE—IT ENDURES FOREVER



AVOID THIS!

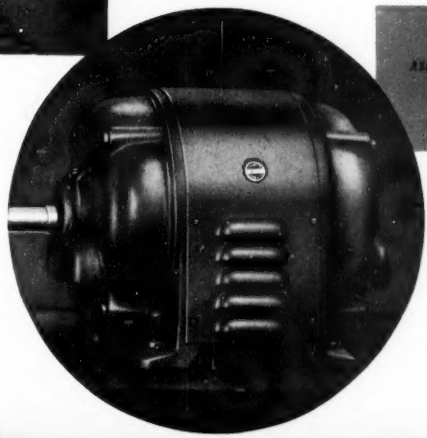
U. S. MOTORS

are asbestos-protected

Life of a motor is proportional to the life of the insulation protecting its windings. While there is no way to guarantee perpetual life, there *is* a method of insulating the windings so that life will be infinitely increased—by using *asbestos insulation*. That is the proved element used in insulating the windings in U. S. Motors. Asbestos is the greatest of all pliable, heat-resisting materials.

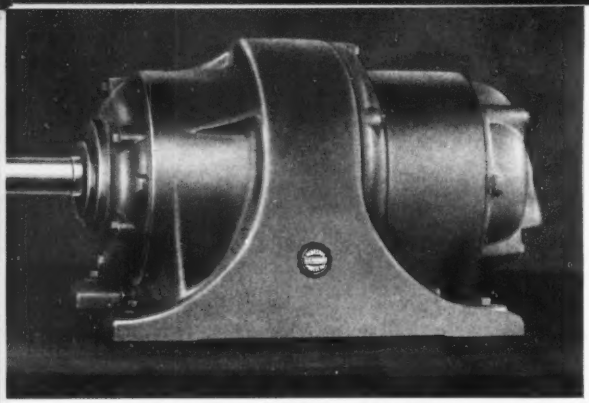
U. S. WINDINGS MOST RESISTANT TO HEAT

A burnt-out motor is evidence that the windings have failed. Commonly used cellulose materials can carbonize, changing from insulator to conductor, whereas asbestos is a fibrous rock whose silken fibres can turn red hot but *cannot carbonize*. U. S. windings are forever protected.

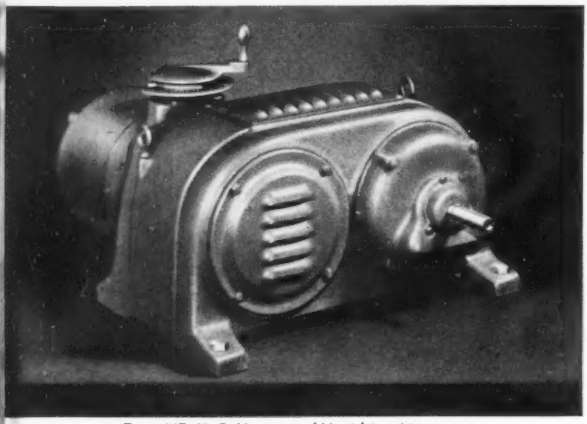


(A)—Empty stator slot before insulating and winding. (B)—Formed cell of asbestos providing a heat-proof wall of insulation. (C)—Cross section showing wires inserted, with asbestos cell covering entire winding. Asbestos plateboard in center of slot separating and insulating between coils. (D)—Asbestosite (in color) forced around windings, penetrates every interstice.

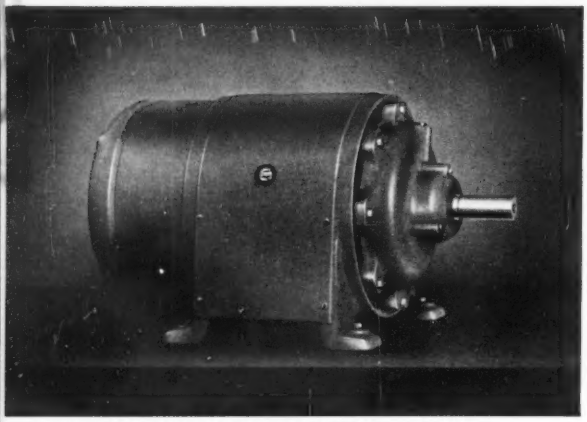
(See next page)



Type GD, U. S. Syncrogear Motor



Type VE, U. S. Horizontal Varidrive Motor



Type SE or SD, U. S. Totally-Enclosed Fan-cooled Motor

U. S. MOTORS

offer these advanced features:

ASBESTOS-PROTECTED WINDINGS
NORMALIZED CASTINGS
ANNEALED STEEL LAMINATIONS
SOLID CENTRICAST ROTORS
DUAL CYCLONE VENTILATION
LUBRIFLUSH LUBRICATION
STREAMLINED, SHIELDED HOUSINGS

Since the inception of U. S. Motors in 1908, a highly successful principle has been maintained—*to build up to a quality*, not down to a price. You can sense U. S. quality in the appearance of these motors. But even more impressive are the many advanced features that insure longest life.

Every U. S. Motor is asbestos-protected—because asbestos *cannot* carbonize. This is an exclusive U. S. feature. By normalizing castings, bearing alignment is maintained so that destructive stresses cannot occur. Lubriflush lubrication presents a convenient means of purging the bearings of old, worn-out grease and replacing the entire bearing chamber with new lubricant without disturbing the bearing setting. The bearings are also self-lubricated for normal life so that even if the old grease is never replaced, bearings are protected.

YOU'LL FIND LOTS OF INTEREST IN THIS BULLETIN
—showing 15 latest types of U. S. Motors

All types of U. S. Motors reproduced from natural color photos are included, to give you a clear conception of the extensive line available. Write for Bulletin 1543. Mention type of motor you desire and Bulletin featuring that type of motor will also be sent.

U.S. ELECTRICAL MOTORS Inc.

PACIFIC PLANT: Los Angeles 54, California **ATLANTIC PLANT: Milford, Connecticut**

Atlanta 3, Ga.; Bakersfield, Calif.; Boston 16, Mass.; Chicago 8, Ill.; Cincinnati 16, Ohio; Cleveland 14, Ohio; Dallas 9, Texas; Detroit 2, Mich.; Fresno 1, Calif.; Houston 4, Texas; Indianapolis 4, Ind.; Milwaukee 2, Wisc.; Minneapolis 2, Minn.; New York City 6, N. Y.; Philadelphia 2, Pa.; Pittsburgh 2, Pa.; San Francisco 7, Calif.; Seattle 4, Wash. » » » » *Distributors and Agents in all principal cities.*

Congratulations to the Food Industry of America

Enriched foods mean better living for the American people. Ten years ago, when American millers and bakers introduced enriched flour and bread, they launched a new era in nutrition.

Since then, faith in the Enrichment Program has been reaffirmed many times. The human values of enriched foods have been factually established in terms of higher health levels and improved mental and physical vigor.

As we enter the second decade of Enrichment, Merck salutes the Baking and Milling Industries of America for this accomplishment.

MERCK VITAMIN PRODUCTS FOR ENRICHMENT AND FORTIFICATION:

VITAMIN B_1

Thiamine Hydrochloride (*Vitamin B_1 Hydrochloride*)

Thiamine Mononitrate (*Vitamin B_1 Mononitrate*)

RIBOFLAVIN (*Vitamin B_2*)

NIACIN (*Nicotinic Acid*)

ASCORBIC ACID (*Vitamin C*)

Merck Enrichment Ingredients for Millers, Bakers, Cereal and Macaroni Manufacturers —Merck Vitamin Mixtures for Flour Enrichment—Merck Bread-Enrichment Wafers—Merck Vitamin Mixtures for Corn Products Enrichment—Merck Vitamin Mixtures and Wafers for Macaroni Enrichment.

Merck is Proud to Have Played a Part in the Enrichment Program

For several years before the birth of Enrichment, Merck research and production staffs had been at work on the synthesis and manufacture of thiamine, riboflavin, niacin, and other pure vitamins. When they were needed for the Enrichment Program, as well as for general food fortification, Merck was ready.

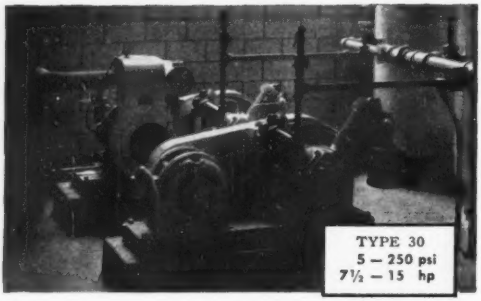
We are proud to have been associated with the food industry throughout these ten historic years of Enrichment.

MERCK VITAMIN PRODUCTS

For Enrichment and Fortification

MERCK & CO., INC.
Manufacturing Chemists
RAHWAY, NEW JERSEY
In Canada: MERCK & CO. Limited—Montreal

You can always depend on I-R compressors for real economy

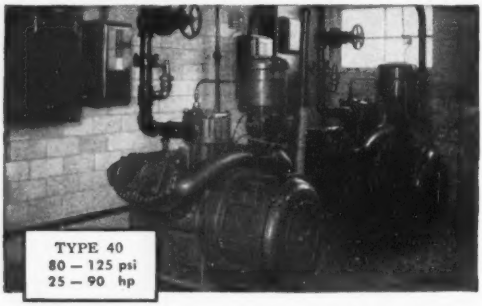


Single- and two-stage, air-cooled compressors, available as complete "packaged" air plants, with motor and compressor mounted on an air receiver — or with motor and compressor base-plate mounted for connection to separate receiver.

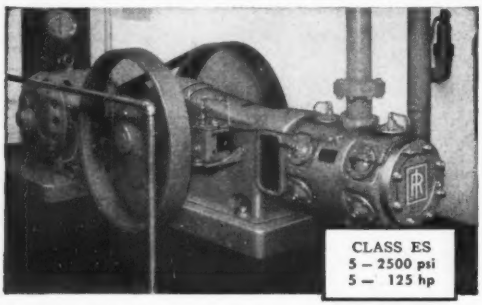
- **EFFICIENT OPERATION**
- **LOW MAINTENANCE COSTS**
- **EASY INSTALLATION**

Whatever your compressed air requirements, there's an Ingersoll-Rand compressor that's *right* for the job. As mechanical and compression efficiencies are high, the unit will deliver full rated output with consistently lower power requirements. With its rugged, dependable construction the I-R compressor will stay on the job longer, with less time out for maintenance.

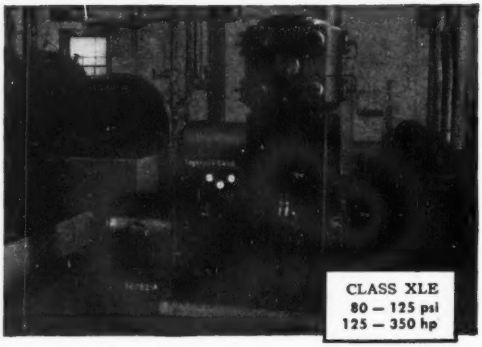
You can be sure of receiving real economy from *any* Ingersoll-Rand compressor . . . a machine that is economical to install, run, and maintain. Contact your nearest I-R branch office for complete information.



High-capacity, two-stage compressors with air-cooled cylinders and intercoolers, available with three types of electric motor drive: V-belt, flexible coupling, and unit type with compressor and motor on common shaft. All units are highly efficient, compact, and light in weight.



Heavy-duty, high-pressure units with one, two, and three stages — arranged for electric-motor or steam drive. These double-acting, horizontal crosshead-type compressors, with I-R Channel Valves, and water-cooled cylinders, are built for continuous full-load service under severe operating conditions.



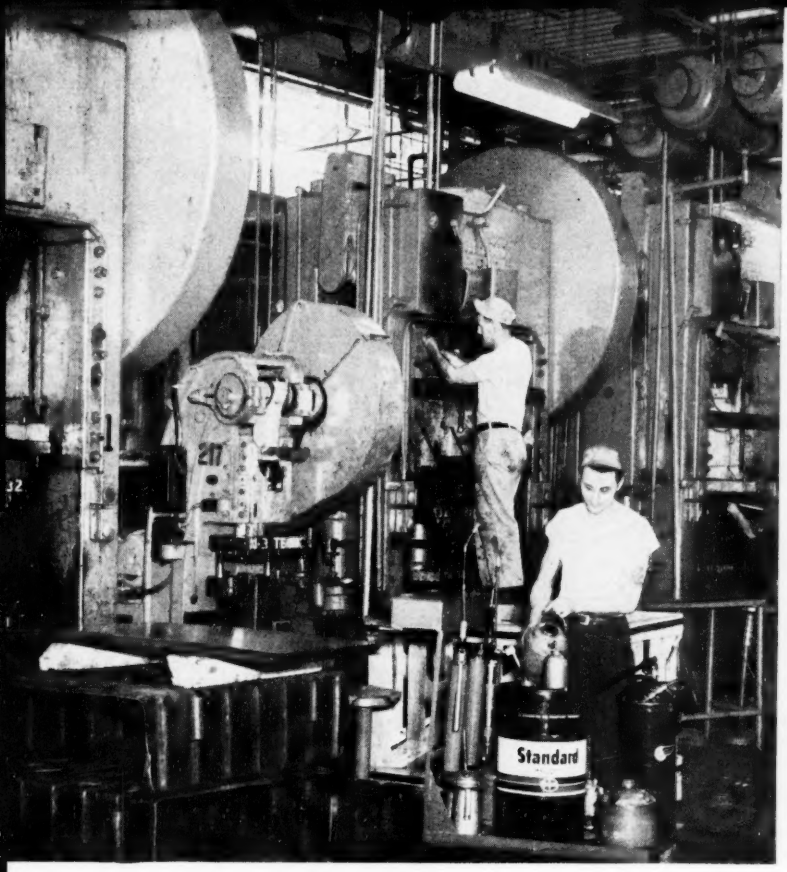
Heavy-duty, double-acting, two-stage, water-cooled compressors, featuring a completely new "L" design which makes them the simplest, most compact, most accessible, and most economical units ever developed. Pipeless, Thru-Frame Air Flow, packaged intercooler, and built-in electric motor save space — reduce installation, power, and maintenance costs.

OTHER TYPES . . . AND SIZES TO 3000 HP

Ingersoll-Rand

581-1 11 BROADWAY, NEW YORK 4, N. Y.

COMPRESSORS • AIR TOOLS • ROCK DRILLS
TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS
DIESEL AND GAS ENGINES



No drips in this press room

WHEN plant engineers at the A. O. Smith Corporation Kankakee Works tested STANODRIP Dripless Oil No. 59 on the recommendation of a Standard Oil lubrication specialist, they found the solution for press room lubrication troubles.

STANODRIP ended the drippage of oil from bearings on stamping and punch presses. That meant cleaner and safer working conditions, less lubricant consumption, and fewer lubrication applications. As a result, STANODRIP is now used throughout the press room and is being adopted by other departments as well. "Reduced maintenance costs and longer life of our equipment are definite advantages . . . ," says Don Hartquist, Plant Engineering Supervisor.

To help put STANODRIP Dripless Oils to work wherever leakage or drippage is a problem . . . or for assistance in all phases of industrial lubrication . . . call in the Standard Oil lubrication specialist in your area. Contact your local Standard Oil Company (Indiana) office, or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

Stanodrip
REG. U.S. PAT. OFF.
Dripless Oil

What's your problem?

C. B. Eggen of the Standard Oil office in Joliet is the specialist who helped solve this press room lubrication problem for A. O. Smith Corporation.

With a broad background of practical experience and special training, his service is typical of the assistance available to plants located everywhere in the Midwest. Like others in the corps of Standard Oil lubrication specialists, he makes his headquarters near the plants he serves.

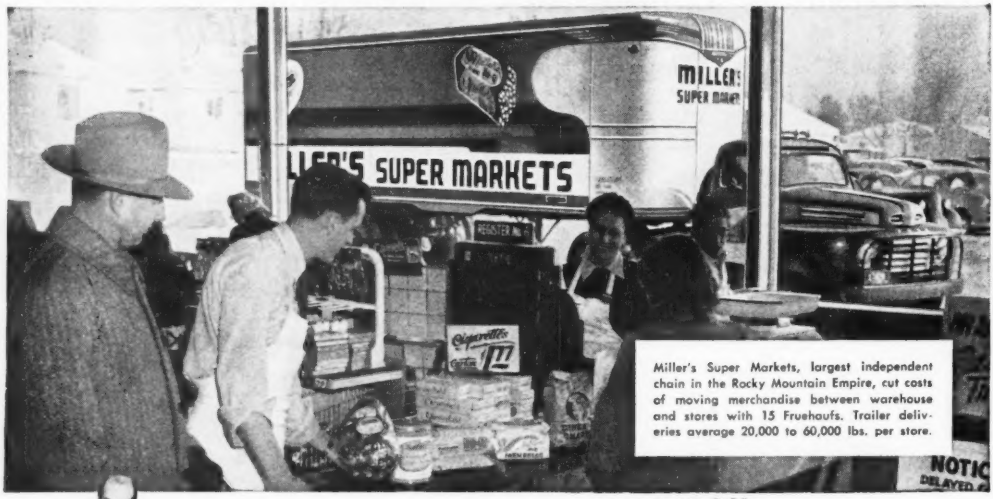
To take advantage of prompt, on-the-spot service in your own plant, phone or write the Standard Oil office in your area. When the lubrication specialist calls on you, be sure to get full information on these fine Standard Oil products:

CALUMET Viscous Lubricants—These greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of open gears and chains, better internal lubrication of wire ropes.

STANORUST Rust Preventives—The eight grades of STANORUSTs form one of the most complete and effective lines of rust preventives available. Each has been scientifically developed for its intended use. The grades range from a fingerprint remover to a heavy petrolatum that protects against corrosion for years under the most severe outdoor exposure.

STANDARD OIL COMPANY STANDARD *(Indiana)*

TRAILERS TRIM COSTS for TODAY'S BIG "SUPERS"!



Miller's Super Markets, largest independent chain in the Rocky Mountain Empire, cut costs of moving merchandise between warehouse and stores with 15 Fruehaufs. Trailer deliveries average 20,000 to 60,000 lbs. per store.

Paul Cohen, Supt. of Warehousing & Transportation, Miller's Super Markets

"WE MOVE TWICE AS MUCH... TWICE AS FAST... AT HALF THE COST... WITH TRAILERS"

"IN OUR OPERATION, every step taken to trim distribution costs enables us to pass extra savings on to our shoppers.

"We've *doubled the volume and speed* of our deliveries and *trimmed our operating costs in half* by 'trailerizing' our truck fleet," reports Paul Cohen, Supt. of Warehousing & Transportation, Miller's Super Markets, Denver.

"Our Fruehauf Aerovans were placed in service in 1946. Other than regular maintenance, periodic painting and negligible repairs, not a penny has been spent on these units in 5 years of steady 6-day-a-week operation.

"Our refrigerated Aerovans hold their temperatures — protecting the appetizing goodness of our daily-fresh edibles.

"Not only do we consider our Fruehauf Trailers essential to our operation, but we feel this fleet of handsome 'rolling billboards' is a major advertising asset."

The food field is just one of over 100 different industries — businesses large and small—finding in Fruehauf Trailers the way to faster, lower-cost distribution. It will pay you to investigate their application to your business.

Write today for Fruehauf's *free* "Transportation Cost Analysis." The Fruehauf Trailer Co., 10956 Harper Ave., Detroit 32, Mich.

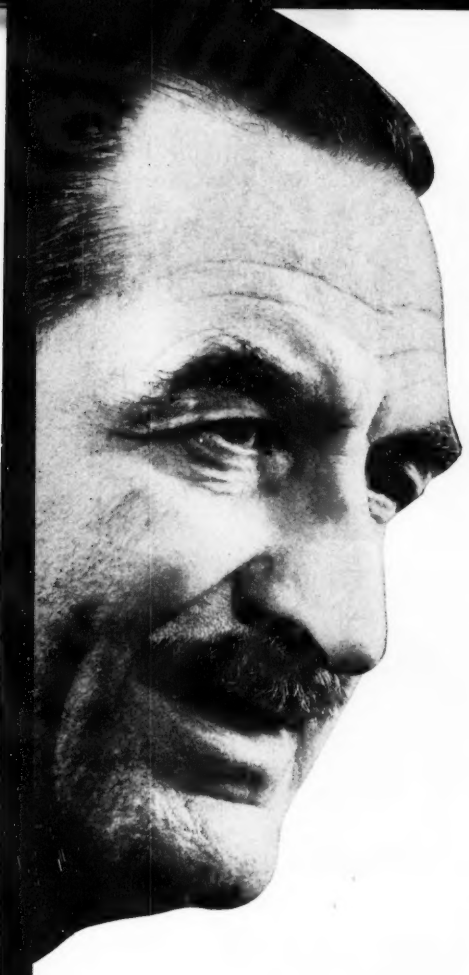
FOODS GET BETTER RIDE!—Exclusive Gravity-Tandem Suspension gives loads a level, cushioned ride. Self-steering action saves tires and fuel . . . cuts product damage. *Users get up to 4 times normal tire service!*

FOODS GET BETTER PROTECTION!—Exclusive integral-frame construction gives greater strength with less weight . . . for bigger load capacity. Trailer is engineered throughout for long life with low upkeep.

FRUEHAUF *Trailers*

World's Largest Builders of Truck-Trailers

YOUR FOOD — and almost all your daily living necessities — are brought to you all or part way by Trucks and Trailers. They make up Motor Transport — our nation's largest transportation system — employing 1 out of every 7 American people.



Vitamin A

enriches both your products and your profits

LIKE many others, you may find that a fine way to touch off a boom in your sales is to put on your label the words: "Enriched with Vitamin A."

DPi's concentrate, unexcelled among natural materials for freedom from taste and odor, may be just the "something extra" you need to put an upward slant in that sales curve.

Or you may find that Myvax 16 Synthetic Vitamin A Palmitate is the answer for your particular product.

Natural *or* synthetic—you get the world's finest vitamin A from DPi. Working it into your plant processes is not at all complicated, and the price is lower now than it has been in years. Let's arrange a date at one of our sales offices and go into the details thoroughly. ***Distillation Products Industries,*** 723 Ridge Road West, Rochester 3, N. Y. (Division of Eastman Kodak Company). Sales offices: 570 Lexington Avenue, New York 22, N. Y. • 919 North Michigan Avenue, Chicago 11, Ill.

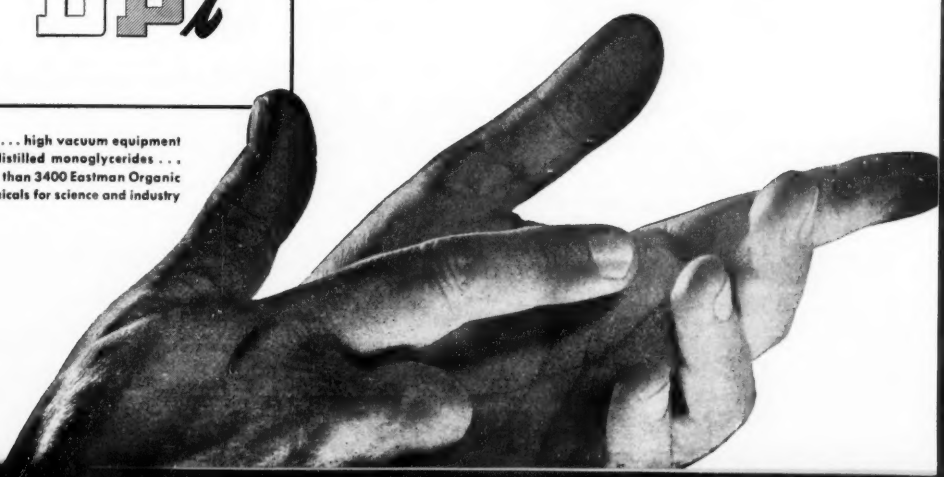
- W. M. Gillies and Company, Los Angeles and San Francisco
- Charles Albert Smith Ltd., Montreal and Toronto.

"Myvax" is a trade-mark

DPi

leaders in research and production of both natural and synthetic vitamin A

Also . . . high vacuum equipment . . . distilled monoglycerides . . . more than 3400 Eastman Organic Chemicals for science and industry



Doesn't Your Business DESERVE the BEST in Sanitizing Agents?

The ORIGINAL Quaternary Ammonium Germicide

INSIST ON GENUINE Roccal BRAND SANITIZING AGENT

to do a more effective sanitizing job throughout your plant!

Petri dish showing colonies of bacteria before the use of ROCCAL.

Petri dish showing no bacterial growth after the use of ROCCAL.

In the Food Industry, the importance of using only the best in sanitizing methods cannot be over-emphasized.

In Roccal, the *original* quaternary ammonium germicide, the food industry is offered a sanitizing agent that is laboratory controlled and tested. The uniform quality of Roccal means uniformly good results in doing a proper sanitizing job.

Roccal is a powerful germicide. In recommended dilutions, it is non-poisonous, non-irritating to the skin, virtually odorless and tasteless.

Roccal can be used for every sanitizing job in processing and packaging in the following food industries: milk, cream, ice cream, butter, cheese, egg breaking, sugar, fish, poultry, fresh frozen vegetables and fruits, meat products, cereal products, candy and beverage, wherever the product comes in contact with equipment. Also to keep walls and floors sanitary.

USES IN FOOD INDUSTRY

To Sanitize:

- STORAGE BINS
- FREEZING UNITS
- REFRIGERATORS
- CONVEYORS
- TANKS
- PROCESSING EQUIPMENT
- PACKAGING EQUIPMENT
- AIR CONDITIONING AND COOLING SYSTEMS
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- WASH ROOMS
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- AND AS A HAND RINSE FOR HELP

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Distributor of the products formerly sold by Special Markets-Industrial Division of Winthrop-Stearns Inc., and Vanillin Division of General Drug Company.

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YALE INDUSTRIAL TRUCKS

HERE are gas and electric trucks that will help gear your plant for *all-out* efficiency!

These Yale fork lift trucks stack materials nearly 16′ high... put wasted aisle and overhead space to work... relieve workers from costly, slow, back-breaking hand lifting.

They stay on the job, too... keep production lines well fed and shipments rolling. For example, the Yale electric truck with magnetic contactor controls cuts "down time" to a minimum. The Yale gas truck with fluid drive greatly increases clutch life and reduces maintenance costs. And these are only two Yale exclusives–there are many others!

Let Yale help you mobilize your plant for *greater production at lower unit costs* right now! Send coupon today for all the facts.

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WHEN THE FIRST ELECTRIC FAN WAS INVENTED

BACK IN THE 1880's

When the cooling comfort of the first electric fans was considered a luxury, KOVEN was helping food manufacturers develop new food delights by fabricating Individualized Equipment. Today, KOVEN is standard equipment in many leading food plants because it is designed to meet *individual* production needs, and thus can be relied on to give more efficient and economical performance. Let us show you how KOVEN Individualized Equipment can help you realize greater profits through increased production. Ask for a consultation today—no obligation. Our complete modern facilities include: machine, sheet and plate, welding and galvanizing shops, X-ray equipment and stress-relieving furnace.

L. O. KOVEN & BRO. INC.
154 Ogden Ave.,
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Koven

WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT

Steel mixing tank

Among the many KOVEN products in all commercial and non-corrosive metals: Stainless Steel; Aluminum Sheet Fabrication; Boxes, Tote, Waste Cans; Chemical Apparatus; Coils and Pipe Bends; Copper Sheet Fabrication; Galvanizing Work; Mixers, All Kinds; Monel Metal Fabrications; Pails, Special Heavy; Pans, All Types, All Metals; Sinks, Scullery and Factory; Tables, Galvanized or Monel; Tanks, All Types, All Metals; Kettles, All Types, All Metals; Fabrication to A.S.M.E. Code Par. U-68 and U-69 a specialty.

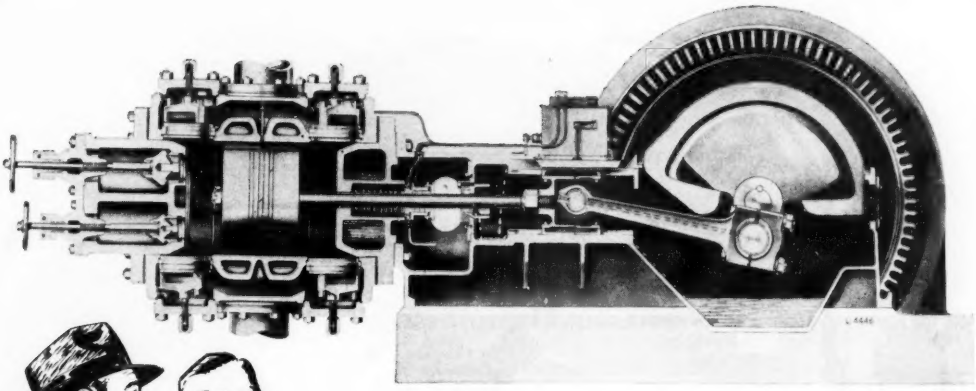
Plants:

Jersey City, N. J.

Dover, N. J.

long
horizontal tank

KOVEN FOR INDIVIDUALIZED FOOD EQUIPMENT SINCE 1881



Cutaway of typical Worthington horizontal compressor which has many advantages for loads over 450 tons.

Why a Horizontal Compressor for the Heavier Refrigeration Loads?

Worthington, unlike other refrigeration compressor manufacturers, makes *all three* types of ammonia compressors—vertical, Y-type, horizontal—to cover the complete range of customer needs.

For the *heavier* loads, Worthington offers a complete range of *horizontal* compressors. Why? What are the advantages of horizontals for heavier loads?

1. More work done. Only the horizontal is double-acting—that is, the piston is working on both strokes.

2. Two stages of compression in one machine. For low-temperature work, the horizontal can have two stages of compression—no second or booster compressor needed.

3. Easier maintenance. All parts of compressor accessible from working floor—no "high altitude" maintenance. Pressure is maintained only in the cylinder—so frame can be opened for maintenance without losing compression or the refrigerant.

4. More flexibility. Horizontals can be installed duplex—that is, two cylinders on different frames operated by the same driver.

Special reasons for using Worthington horizontal compressors include:

1. **wide range of sizes up to 1000 tons**
2. **double-seal housing (optional)**
3. **variable capacity control (optional) of various types, including automatic**
4. **famous Worthington Feather* valves—simplest, most efficient ever made.**

Investigate *more worth with Worthington*. Consult Classified Telephone Directory for nearest Worthington distributor. Worthington Pump and Machinery Corporation, Air Conditioning and Refrigeration Division, Harrison, N. J., specialists in air conditioning and refrigeration for more than 50 years.

*Reg. U. S. Pat. Off.

A-1-39

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THE MOST COMPLETE LINE...ALWAYS THE CORRECT RECOMMENDATION

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This world-wide organization sells the most complete line of Industrial Trucks and Attachments on the market. Equally important, they have skilled service mechanics and adequate parts stocks to keep your lift trucks running better at lower cost.

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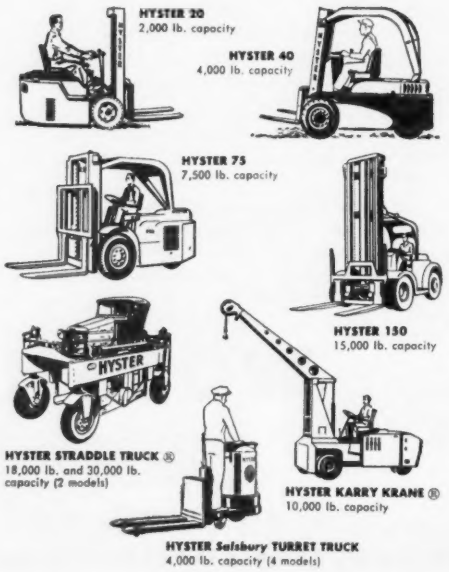

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QUALITY PRODUCTS

FOR FOOD PLANT CLEANING

Solvay offers you a superior line of cleansers for the food plant. Whatever your needs may be, you may be sure that there is a Solvay cleaning product to fit them. You may be sure, too, of the quality of these products . . . for Solvay is America's oldest and largest producer of alkalies and associated chemicals. For cleansers of dependable quality, specify Solvay.

for General Cleaning

New! Improved!

1 CLEANSER No. 600

A new, greatly improved formulation of one of America's best known general maintenance cleansers. Five modern ingredients combine their special properties to make "tough" cleaning jobs easier, more economical.

2 CLEANSER No. 615

A brand new cleanser of the 600 series, Cleanser No. 615 provides more detergent action for more difficult cleaning jobs. Specially developed for hard water, this product substantially cuts cleaning costs in these areas.

3 NYTRON*

Solvay's new, exclusive wetting agent-detergent. Not an alkali, not a soap, not a mixture. Exceptional detergency and rinsability—in hot or cold, hard or soft water—combined with mildness and safety give Nytron a wide variety of uses in the food plant. It will not dull painted or polished surfaces . . . use it for regular cleaning of equipment, floors, walls, windows, trucks, etc.

4 GREEN LABEL COMPOUND

A new, low-cost, high-performance general cleanser. Contains the most modern materials, including a special wetting agent. Provides exceptional performance at a low price.

5 SUPERSHEEN*

Sets a new standard for machine dishwashing performance. Excellent in hard or soft water. Prevents the formation of lime scale, keeps the machine and spray jets clean. Safe for tin and aluminum utensils; wonderful for removing baked-on soil.

for Special Cleaning

6 SCOURING CLEANSER

A Solvay cleanser for stubborn soil. In addition to abrasive action, this product has excellent wetting, penetration and rinsability.

7 CAN WASHING CLEANSER

A brand new Solvay cleanser for machine can washing. Particularly effective for baking pans, dairy cans, mixing vessels, etc.

for Heavy Duty Cleaning

8 CAUSTIC SODA

A basic alkali from America's oldest and largest producer. High pH and high neutralizing value give Solvay Caustic Soda "bite" that will do the most difficult cleaning jobs with highest efficiency.

for Bottle Washing

9 ANCHOR ALKALI

One of America's largest selling bottle washing cleansers because it produces bright, sparkling-clean bottles at minimum cost. Anchor Alkali sterilizes effectively and rinses quickly and completely.

10 ACE ALKALI

Solvay's brand new bottle washing cleanser. A premium product for premium performance...Ace Alkali produces exceptional results in the most difficult bottle washing operations and with the hardest water.

11 SPECIAL FLAKE ALKALI

For hydro and spray type bottle washing equipment, where foaming is a problem, specify Solvay Special Flake Alkali for best results.

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Detailed literature and samples of all these Solvay products are available without any cost or obligation. Here's all you need do—tear out this coupon; put a check mark next to the products in which you are interested . . . print your name and your company name and address in the space below . . . and mail the coupon to us. Your samples and literature will be sent promptly. Don't delay—mail this coupon today!

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CUT DELIVERY COSTS

with the WHITE 3000!

TRI-CITY PRODUCE CO., Albany, N. Y. has this White Model 3014 with drop-frame design for wholesale delivery to restaurants, meat markets and hotels.

SAVE DELIVERY TIME . . . cut delivery costs with the White 3000 engineered *right* to your own company's requirements.

This entirely new kind of truck is a time-saver and a step-saver for the driver. Low-level cab is easier and quicker for the driver to enter or leave from either side. Specially designed drop frame saves reaching . . . saves energy.

Outstanding maneuverability saves driving time in traffic and hard-to-get-at places . . . in restricted traffic areas . . . at delivery entrances. Shorter wheelbase permits larger body without increasing overall length . . . saves space on the street, in the garage, at loading docks.

New safety features, wide-angle visibility, driving ease are other *new* advantages of this truck that *stays* new. Power-lift cab provides front-end accessibility for maintenance and inspection . . . instantly.

Find out for yourself how this new kind of truck for your delivery service saves time . . . cuts costs . . . for years!

THE WHITE MOTOR COMPANY

Cleveland 1, Ohio

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Keep your Whites in good working condition

Tips its cab to service

For more than 50 years the greatest name in trucks

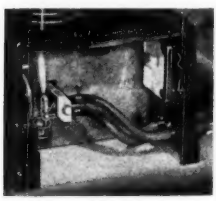
Another Important Instrumentation Development by Beckman . . .

*Greater Compactness
*Higher Accuracy
*Lower Sample Consumption
*Maximum Convenience

THE NEW BECKMAN
Flame Photometry Attachment
FOR BECKMAN "DU" SPECTROPHOTOMETERS

To meet the steadily growing interest in flame spectrophotometric methods, Beckman engineers have developed a new Flame Photometry Attachment that sets greatly advanced standards of compactness, convenience, accuracy and simplicity.

Used with the Beckman "DU" Spectrophotometer and standard oxy-hydrogen or oxy-acetylene equipment, it combines the unusually high accuracy and resolution of the well-known Beckman "DU" with the conveniences of flame spectrophotometric methods, providing an instrument capable of the quantitative determination of more than 40 elements, including heavy metals and rare earths, as well as the alkali metals.



The atomizer-burner of this new instrument is much smaller, simpler and more trouble-free than previous designs. Made of Pyrex with a straight, large-diameter, noble-metal atomizer tube discharging directly into the flame, it will spray even cloudy or highly concentrated solutions indefinitely without clogging or "drifts".

Other important features of this new Beckman development are outlined at right. Best of all, this new instrument is available at a new low price for equipment of this quality. Your nearest authorized Beckman Instrument dealer will gladly supply full details—or write direct!

BECKMAN INSTRUMENTS INC.

SOUTH PASADENA 15, CALIF.

Factory Service Branches: Chicago • New York • Los Angeles

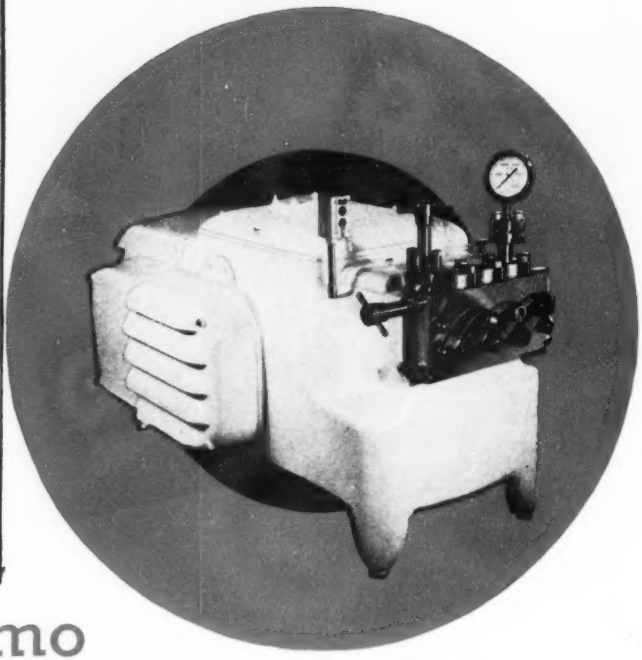
Illustration at right shows atomizer-burner actual size.

Outstanding Features of the New Beckman Flame Photometry Attachment

- Sample beaker is supported in a unique mechanism that swings the beaker outside the case for easy filling, or swings it back into position below the burner tube. Further, as the beaker is raised into position below the burner, it automatically tips so that sample solution is drawn from lowest point in beaker. Thus, complete analyses can be made with even extremely small samples.
- The atomizer requires only about 2 ml of sample solution per minute, and a sample of 1 to 3 ml is ample for determination of several constituents.
- Fuel consumption is very low—about 5 cu. ft./hr. for acetylene, 8 cu. ft./hr. for oxygen, 20 cu. ft./hr. for hydrogen.
- The hot flame, coupled with the high resolution of the "DU" Spectrophotometer, permits unusually narrow band widths to be used—less than 10 millimicrons for most determinations. Accuracies of 0.5% or better are obtainable.
- Sample concentration is unimportant (provided it is above the lower detectable limit) permitting maximum versatility and convenience in making analyses.
- Although the sensitivity of most elements is improved when the elements are in water solution, non-aqueous solutions are as easily handled as water. Even combustible solvents can be used—and in fact, organic solvents frequently increase sensitivity of the readings.
- The atomizer-burner, sample-positioning device, focusing mirror and adjustments are all unitized into a compact, cast-metal housing. All necessary regulators and gauges (except standard regulators on fuel and oxygen tanks) are conveniently mounted on a separate control panel.

Write for complete details on this important new Beckman advancement!

For a finer product — at lower cost — use the Superhomo, industry's finest and most sanitary homogenizer. Capacities from 50 to 2500 g.p.h.



"Superhomo

. . . is doing an Outstanding Homogenizing Job in Our Plant"

. . . that's typical of the reports we're receiving these days as more and more food plant operators discover the outstanding job Superhomo is doing on flavors, extracts, starch slurries, syrups, fruit and vegetable juices, beverages, confectionery products and many others.

They have discovered that the Superhomo is the modern way to achieve the advantages of homogenization — improved product quality, taste and appearance. Superhomo is the industry's choice because of its many exclusive and superior features that assure the best in homogenizing performance.

For example: simple, efficient, patented single or two-stage homogenizing valve gives complete control of viscosity and assures emulsion stability. Patented solid stainless steel cylinder block is sanitary . . . easily cleaned and corrosion resistant. The Superhomo has a rugged, compact frame and drive mechanism, designed to give many years of trouble-free operation.

Call the Cherry-Burrell representative nearest you and ask him to help you plan now. And order now so that material shortages and delayed deliveries won't affect your plans for a better product tomorrow.

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☐ Send new Superhomo Bulletin
☐ Have representative call

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Firm .....
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Yes, he's been hit hard by science's new killer—but food men see special problems

Just How Effective *Is* Warfarin?

Curbing rodents in food plant is "question of quickness," contends Coast sanitarian . . . Says new agent's big potential is where speed is secondary

DONALD H. LITTLE
Director, Department of Sanitation,
Dried Fruit Assn., of California, San Francisco

Impression has been given that in Warfarin we have a rodenticide that is the long-sought answer to all rodent problems in all situations.

■ **But the fact is that the food-plant man cannot go along with such a broad conclusion.**

To put it briefly, food-plant rodent extermination is a decided exception for the reason that here *rapid* extermination of all rodents that gain access to the plant is a "must." The ultimate aim of such control is prevention of all rodent contamination in finished packages of food.

Accordingly, we are still short of attainment of easy, foolproof rodent extermination in the food plant. And the idea that Warfarin is a cure-all for rodent contamination of foods strikes a parallel with the initial enthusiasm for DDT as the complete answer to all fly problems.

Specifically, the food-plant sanitarian must bring the question down to the least common denominator of a single rat or mouse—because of the widespread contamination from only one rodent during even the minimum number of days (5) necessary to kill with Warfarin.

As an example, a roof rat will defecate between 40 and 60 pellets during a 24-hr. period. Hair in quantity is dropped on plant surfaces and rodent urine is scattered indiscriminately. All of these rodent leavings in the plant are potential food-pack contaminants. Multiplying this per-day quantity by 5 (the aforesaid minimum number of days required to kill a rat continuously feeding on Warfarin-poisoned baits) and considering the areas frequented by this one animal—and you have a gage of the serious contamination possible. Note, too, that maximum time may run 30 days.

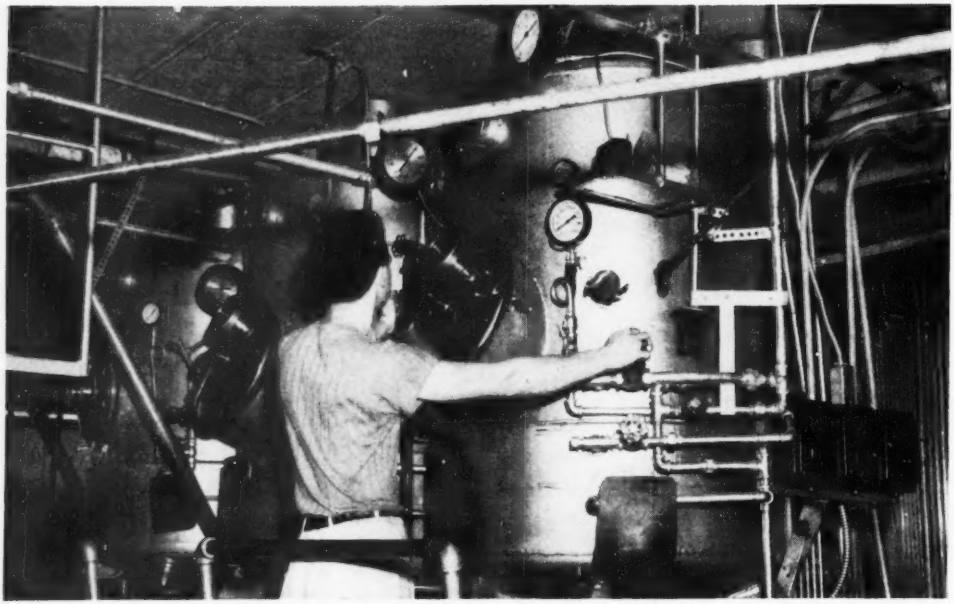
The belief that a break of 48-hr. in the successive daily feeding of rodents on this poison will greatly extend the feeding period necessary to kill makes effective control doubtful in the many plants where large quantities of foodstuffs are continuously present.

Recent reports[1,2] bring out the following information about Warfarin when used in recommended concentrations for rodent control: No bait shy-

(*Turn to page* 180)

The Author "Weighs" New Rodenticide

Pro	Con
■ It does not produce bait shyness	■ It is slow acting—takes 5 to 8 days for Norway rats, 5 to 20 for roof rats, 5 to 30 for house mice
■ Rodents do not develop a tolerance for it	■ It will not give effective control when applied in a single dose
■ It is reasonably safe	■ Feedings should occur within a 10-day interval with no break of more than 48-hr.
■ Secondary poisoning is reported to be unlikely	
■ It is very effective in most applications	



PROMINENT in sparking Mitchell's progress were these three vacuum pans that reduced cooking time for preserves

Perking Up Process Performance

How 10 Changes Did It in Preserve Operation

Time and labor were saved, quality and output boosted, by company's "better way" attack on its handling, cooking, cooling, pumping, filling and labeling problems"

JOHN V. ZIEMBA
Assistant Editor, "Food Engineering"

Top efficiency in the modern manufacture of uniform-quality preserves and jellies has been attained at Mitchell Syrup & Preserve Co., Detroit—via the policy of "Let's find a better way to do it."

Today, this plant has been thoroughly mechanized through adoption of straightline production methods, improved materials-handling technics, labor-saving units, and continuous processing equipment.

The new labor-saving units—many specially designed by President R. D. Mitchell, Plant Manager Frank Wurtz, and Production Superintendent Emil Ruppe—give further advantage by boosting product quality.

In all, ten outstanding changes have been made to promote efficiency:

1. Receiving and handling of liquid sugar has been mechanized (this company pioneered the use of liquid sugar in making jellies and preserves).

2. Preserves and combination apple-fruit jellies are concentrated in vacuum pans for higher retention of color and flavor and to reduce foaming of products.

3. Holding preserves in a company-built cooling pan at the proper filling temperature enables the firm to produce more uniform products. Fruit no longer floats to the top of the jars. Instead, it is evenly distributed through the preserves.

4. A special rubber-diaphragm pump prevents crushing of whole fruit (such as strawberries) while the preserves are being fed to the filling machine.

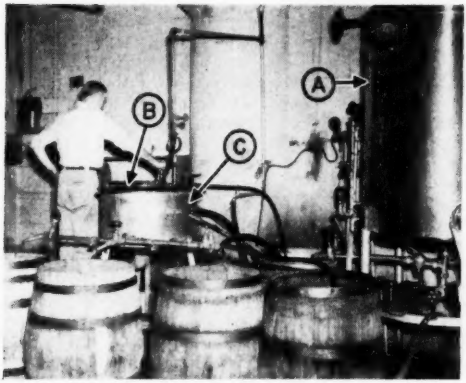
5. The filling machine is now constantly supplied with jellies or preserves with the aid of a float-operated mercury switch that controls the pumping of product into the filler hopper.

6. Application of up to four different private-brand labels to jars is accomplished on two lines coming from the continuous cooler (one line employs a Beeline automatic labeler, the other three Pony semi-automatic labelers).

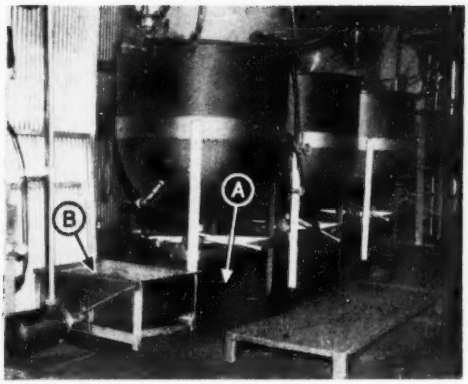
7. Efficient filtering of fruit juices used for making jellies is attained with a company-devised treating tank, equipped with agitator, temperature controller, and automatic liquid-level float.

8. Rapid cooling of fruit juice (from about 180 to 90 deg. F.) is achieved in a company-made cooler using running cold water or ice. Here, a multi-barrel filling system is employed.

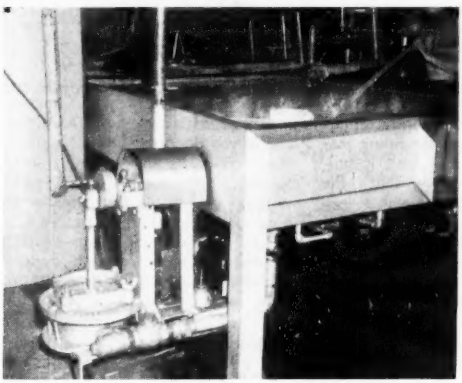
Camera Reveals New Efficiencies



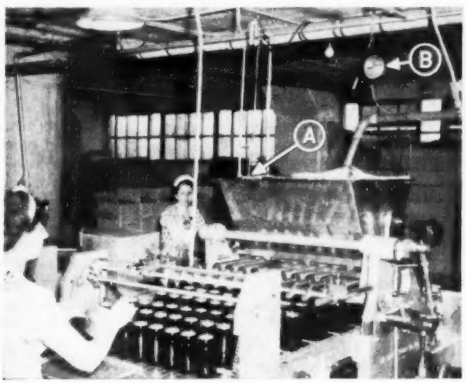
FASTER juice filtering and cooling system. Juice is heated and mixed with filter aid in make-up tank (A), filtered (B), cooled (C), and filled into four barrels simultaneously.



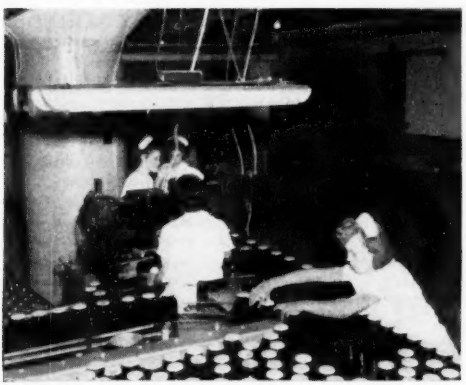
BY USING enclosed trough (A) to feed jellies from five steam-jacketed kettles to holding tank (B), company now needs only one pump to deliver product to cooling pan.



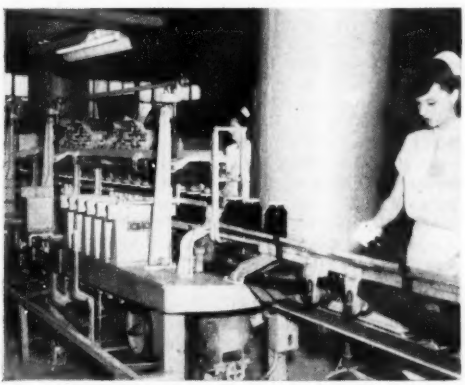
SPECIALLY DESIGNED cooling pan keeps products at proper filling temperature and consistency. Rubber-diaphragm pump handles whole fruits without crushing them.



CONSTANT SUPPLY of preserves is maintained in hopper of filling unit by automatic liquid-level control (A). Indicator (B) aids in control of product temperature.



LABELING LINE is versatile. Flow of jars is split between these three semi-automatic machines and . .



. . . **THIS FOURTH** labeler—a fully automatic unit handling approximately 100 jars per minute.

9. Separate cooling and freezing rooms have been installed—affording short-time storage of fruits and juices in event of breakdown of any machines on the production lines. These rooms save costs formerly encountered in returning these materials to commercial cold storage.

10. An enclosed stainless steel trough has been installed to gravity-feed jellies from five cooking kettles to a small holding tank. Thereby only one pump (instead of five) is needed to deliver jellies to the cooling pan.

Now for the pertinent details on each of these ten improvements:

1—Simplified Handling

First significant change—installation of the liquid-sugar receiving, storing, preheating and metering system—has eliminated many hours of back-breaking labor.

Liquid sugar is now hauled by boat from the plant of Refined Syrups & Sugars, Inc., in Yonkers, N. Y., to Detroit, where it is stored in a series of tanks holding approximately 750,000 gal. From here, it is delivered to Mitchell's by tank car or truck, then pumped into two 1,800-gal.-capacity metal tanks lined with the plastic Tropolite.

Inside each tank and directly above the liquid-sugar level are four ultraviolet lamps that constantly keep the surface of the product sanitary. Periodically, these u-v lamps are checked and replaced by G.E. inspectors.

Before the liquid sugar is metered into the steam-jacketed cooking kettles, it is preheated to 120 deg. F. in a heat-exchanger. Thus, output in the cooking section is increased.

Frozen fruit is held in a commercial cold storage facility located in the same building. Movement of 30- and 45-lb. tins of frozen fruit from this storage to a 30x50-ft. tempering room is by freight elevator and fork-lift truck. Unit heaters in this room raise the temperature to about 100 deg. F., thus enabling the fruit to defrost in approximately 24 hr.

At this point, the defrosted fruit can be used for two different products—preserves or jellies. In making preserves, the fruit requires no further treatment. It is simply weighed in aluminum containers—180 lb. of fruit to a container and two containers of fruit per batch. The fruit then is dumped into three 150-gal. steam-jacketed, premelt kettles, into which liquid sugar is metered and dry sugar as well as pectin and fruit-acid solutions are added.

In making preserves, ingredients are preheated to 110-115 deg. F. and thoroughly blended in propeller-type mixers before being concentrated in vacuum pans. Preheating materially cuts down the cooking cycle, thus greatly increasing the rate of production.

2—Vacuum-Cooking Preserves

Cooking in vacuum pans assures color and flavor stability and does not make such fruit as strawberries mushy. Also, greater efficiency is attained in this concentrating procedure.

From the three premelt kettles, preserves are drawn into one of three stainless steel vacuum cookers, each holding 800 lb. Here, the temperature is raised to 135 deg. F. as the preserves are concentrated under 27 to 28 in. of vacuum. Time is 8 to 12 min., depending upon the type of product being made. The vacuum then is decreased to about 6 in. while the temperature rises to 212 deg. F. Steam is turned off at this point, and the vacuum is raised to 15-18 in., thus cooling the preserves to 175-180 deg. F.

3—Cooling for Proper Filling

There is close control of the temperature of the preserves during filling, through employment of a special stainless steel cooling pan (designed by the company) and a temperature indicator in the hopper on the filling machine. As a result, the fruit is uniformly dispersed throughout the product.

After the preserves are concentrated to a 68-69-percent soluble solids content, they are gravity-fed to the cooling pan, which is jacketed on the bottom into four compartments. Size of the cooling pan is 1x5x20 ft.

The cooling pan was designed to keep the preserves at 180 deg. F. for filling into jars with the fruit uniformly dispersed throughout the product. Filling at this temperature keeps the preserves at just the right consistency, thus preventing the fruit from floating to the top of the jar before the preserves start to gel. Moreover, product uniformity is further assured by assigning a girl to mix the preserves with a T-shaped wooden paddle during the cooling operation.

The correct temperature is maintained in the cooler by manually adjusting valves in the pipes that deliver tap water, warm water (140 deg. F.), or steam to a main line feeding into the four jacketed compartments in the bottom of the cooling pan.

An adjustable, manually-operated stainless steel divider extending across the cooler permits handling of different size batches. And a small stainless steel gate, fitted into the discharge end of the cooling tank, enables the attendent to control more accurately the uniformity of fruit throughout the preserves. Capacity of the gate-enclosed discharge corner of the tank is about 20 gal.

4—Special Diaphragm Pump

Preserves are fed to the hopper of a 10-spout filling machine by a stainless steel, sanitary rubber diaphragm pump, designed to prevent crushing of whole fruit. The diaphragm is of 12-in. dia. and is attached to a stainless steel motor-driven reciprocating Pitman rod.

When the rod raises the diaphragm, the vacuum created draws the preserves from the cooling tank, through a 2-in. stainless pipe, past a check-valve, and into the chamber of the pump. As the rod depresses the diaphragm, preserves are discharged into the hopper of the filling machine.

The motor has a variable-speed drive that controls the flow of preserves through the pump, thereby preventing damage to the machine or loss of product quality. Moreover, all motor circuits are connected to light bulbs that signal the operators when they are running.

5—Constant Level in Filler

A mercury switch (connected to a float in the filling machine hopper) starts and stops the pump to automatically keep the preserves at a uniform level. When the preserves drop below a certain level in the hopper, the pump starts. Then as the float reaches the proper level, the pump stops.

The filling machine can be quickly adjusted to handle containers ranging from 6-oz. tumblers to No. 10 tins. When running 6 to 16-oz. jars, filling is done 10 at a time, or about 120 jars per minute. Using two spouts per can, No. 10 tins are filled 5 at a time, at half the speed of the jars.

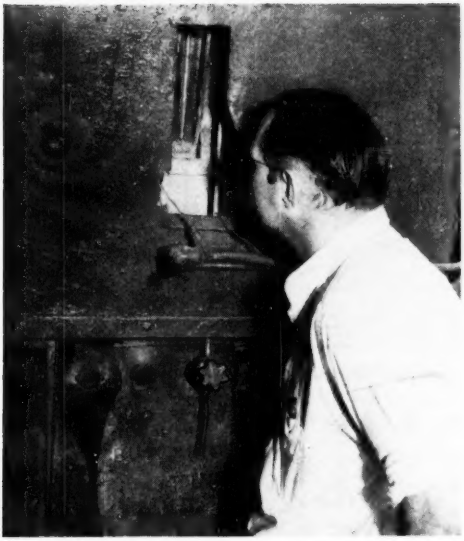
Before entering the filler, empty jars and tins are first inverted by a twister and conveyed to a cleaning unit. Air discharged from jets, under about 100 psi. pressure, blows lint and other extraneous matter from the containers. Then a vacuum jet sucks out any remaining foreign material.

Leaving the filler, jars are conveyed to a White automatic capping machine, and cans go to a sealing unit. Next, the containers are conveyed through a 55-ft. long by 50-in. wide continuous cooler. While traveling through this unit on a wire-mesh belt, containers are sprayed with a fine mist of cold water from nozzles above and below the conveyor. Jars are cooled immediately to prevent discoloration of the jellies and preserves.

Cooling is in three stages to prevent breakage of jars. The first section of the cooler feed end uses the warmest water (150 deg. F.), which has progressively traveled from the

(*Turn to page* 156)

Yesterday **And Today**



BEFORE modern instrumentation, bakers squinted to read oven-temperature to within 10 deg. F. (C. Byoir & Assoc.)

BUT WITH modern instruments, bakers collect many temperatures within 1-deg. on graphic chart (Burny Bros.)

Robotizing Bakery Operations

Fast evolving are new instrument applications to provide safer convoy of goods all along the line, from dough mixers to bread wrappers. And this streamlined, engineered performance is making notable savings in time, labor, and costs

LLOYD E. SLATER
Assistant Editor, "Food Engineering"

The baking industry has done an outstanding job of gearing artisan technics to large volume mechanization. But in so doing, it has created a manufacturing efficiency that allows only a small profit on the items produced.

To stay on the black side of the ledger, bakers are relying more and more on engineered process instrumentation. They know the supervisory dollars that automatic devices can save in a time of rising costs.

Yet, an even more important function of instrumentation is still not fully apparent to many bakers. This is the positive role that it can play in materially reducing the amount of off-quality production—or "cripples"—in their plant.

Only a few bakeries in this country have really started to explore the potential of instrument technics in reducing product losses. In these plants, "cripples" are being engineered out of existence by these technics:

- **Controlled precision in the dough mixing**
- **Exact regulation of proofing and fermenting processes**
- **Closer tolerances in oven zone and time control**
- **Stable product temperature prior to wrapping**
- **Central panel supervision of all processing**

Let us now consider these prime factors in more detail, pointing as we go to outstanding examples.

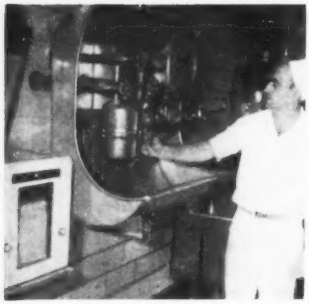
Greatest potential for instrument supervision is at the mixer. Results here much depend, of course, on the

Bakeries Going "Pushbutton"

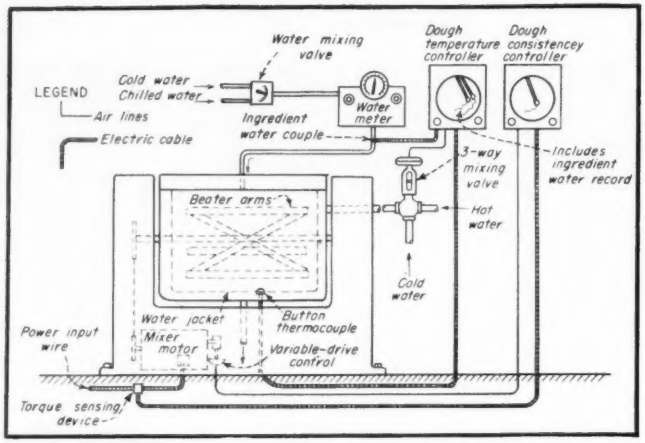
This second article in our series on instrumentation in the food industry relates how automatic devices are being adopted by bread bakeries to bring about savings in time and labor as well as a reduction in off-quality products.

Engineered process instrumentation is now precisely controlling such operations as dough mixing, fermenting, and proofing. Moreover, automatic systems are regulating bread-baking and cooling processes as a safeguard for product quality.

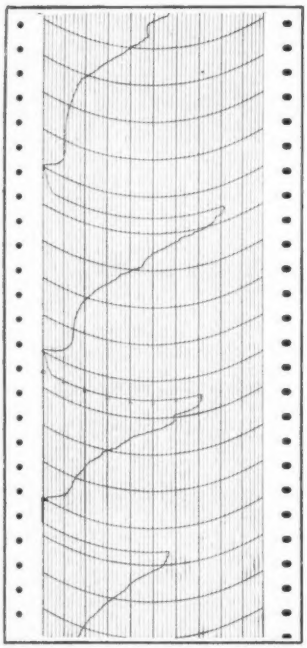
"Robotizing Bakery Operations" carries on the author's careful analyses of food-processing instrumentation. Look for more of these special articles on automatic control in subsequent issues of FE.



DOUGH-WATER blending device, set by Burny operator, fixes liquid's temperature. At left is Mixatron that charts (as shown below) consistency of dough. Peaks indicate end of mix. Curves vary with ingredients.



MIXER CONTROL system. It includes electronic unit for regulating jacket water, also consistency recorder for automatically ending mix.



type of mixer and agitator as well as amount and quality of ingredients. But two unfixed variables also vitally influence proper gluten development during the process—time and temperature. Inadequate control of these variables can affect both quality and yield of finished product.

Dough gives off heat during mixing due to friction and hydration of the flour. To retard excessive temperatures—and thus subsequent failures in fermentation—modern mixers are equipped with refrigerated cooling jackets. Also, recent practise is to add chilled ingredient water for its cooling effect.

Exactly metered and chilled ingredient water can be considered a "fixed" variable in the mixing process. For dough-water blending, devices to simplify this variable have been available for years. Water temperature is set through hand adjustment of this unit, usually located adjacent to the mixer.

In addition, this dough-water blender incorporates a positive-displacement flow meter that automatically stops the water stream when an exact amount has been delivered to the mixer.

But despite "fixed" ingredient water and use of jacket-temperature controls in the mixer, dough temperature development is still unpredictable. In order to place dough under positive control, it is necessary to have a direct and continuous measurement of its temperature during the whole mixing period.

Unfortunately, bulb thermometers placed flush with the inside of the mixer jacket only gave a relative dough temperature reading. Contact with the moving dough mass was never continuous along the active bulb length.

An equipment firm has licked this measuring problem with thermocouples. Experimenting with small wire 'couples at many locations in the mixer bowl, this company finally found a spot at the bottom of the bowl that provided nearly continuous measurement. A "button" type thermocouple—of about ¼ in. dia.—was then flush-mounted through the mixer's water jacket.

Check readings into the dough with a probe thermocouple and potentiometer showed the permanently mounted "button" 'couple to be accurate within ½ deg. F. at all times.

Another investigator—a large baking company—approached the problem along slightly different lines. It worked out a location for a small electrical resistance bulb in the mixer. Very accurate dough temperature recording followed, thus the company was able to obtain immediate gains in mix uniformity. This firm is now in the process of installing the system on all its machines.

However, a step still remains beyond this solution of mixing-temperature measurement. This is to set up an effective automatic mixer-temperature control. It is reasonable to expect that such a system—regulating mixer coolant via true dough temperature—will soon be found practical.

Measuring Dough Development

One other variable—the time factor—plays a decisive role in mixing. For too little mixing can mean irregular gluten development and hydration. And too much mixing causes breakdown of gluten, and the formation of a weak, sticky dough and poorly textured product.

In the past, the effect of the mixing action on various dough ingredients was studied with various laboratory-type instruments. One of the most successful of these, the Farinograph, proved very useful in relating dough consistency to mixing time. It produced a characteristic curve for a mixture, the curve peak showing maximum dough development prior to gluten break-down. In addition, the curve provided a positive check on water absorption value of the mix.

It was obvious that direct measurement of dough consistency during commercial mixing would be an ideal

time check and also reflect actual dough development. A number of years ago, recording watt-meters were applied to simulate this measurement. The idea was to measure power consumption of the mixer motor. This would vary directly with dough consistency or with the tendency of the dough to oppose movement of the mixer arms.

However, mixer "load" measurement —successful in many similar industrial applications—never did work out too well. The power consumption technic simply provided a very sensitive way to follow movements of the dough mass in the mixer arms. Resulting record from the galvanometer-type recording mechanism was so full of peaks and dips that it could rarely be interpreted.

Recently, there was developed an electronic recording instrument—the Mixatron—which has shown marked success in evaluating dough consistency in many commercial installations. This unit picks up induced currents from the mixer motor, then amplifies and converts them into watt-hour impulses. These impulses are then integrated into a single line curve that has been found to correlate with actual dough consistency.

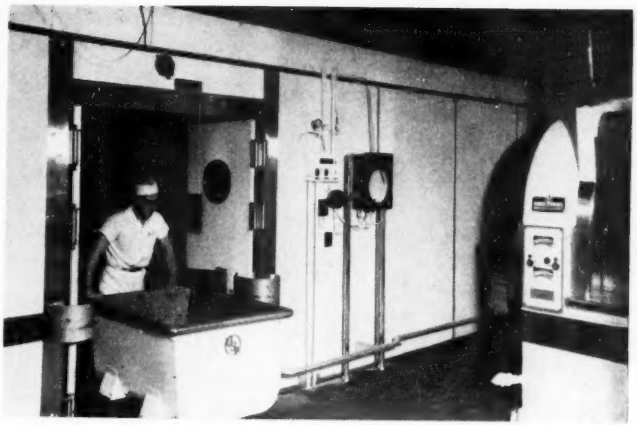
In addition to showing a characteristic and legible peak curve designating proper mixing time, the Mixatron, it is claimed, also serves to (1) point out formulation errors before the dough is fully mixed, (2) indicate optimum mixing time for different types of flours, and (3) provide mixing attendant with a continuous record of dough consistency.

Consistency Control Next

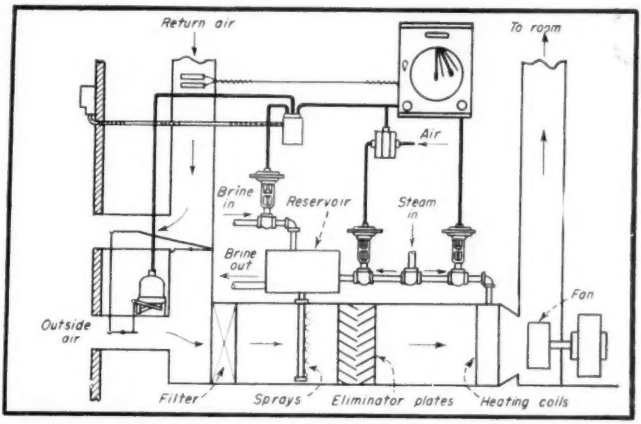
Following the lead of the Mixatron, a few of the industrial control instrument companies have modified servo-type electronic instruments for this job. They figured that the more stable and versatile recording systems of electronic units could eliminate shortcomings of galvanometer type watt-meters tried in the past. An already set-up control in the modern instrument was a natural for positive automatic regulation of the mixer.

However, even improved recording and electronic damping would not give an ideal consistency chart via the load-measurement route. But equipment versatility also suggested a second-hand approach to this measurement. Why not measure the heat developed in mixer input wiring as an average of load conditions?

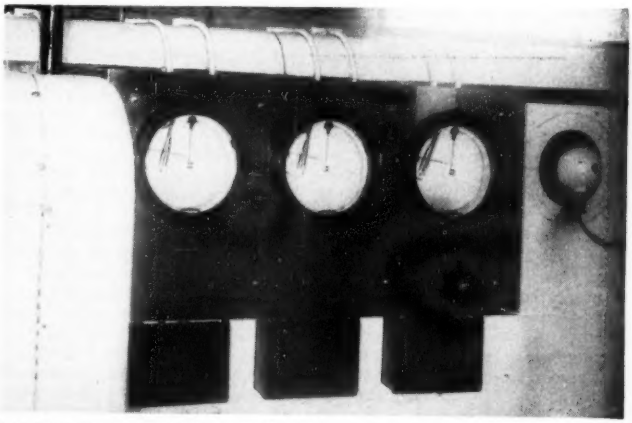
So the latest investigations involve the location of a thermal-converter on the mixer motor input wiring. This device actually measures heat developed around a wire due to load changes. It is believed that this measurement



FERMENTATION follows an ideal cycle in this room due to built-in controls under supervision of two-bulb unit mounted on the outside (Burny Bros. photo)



AIR CONDITIONING control system for fermentation room has outside 'stat. Thus, fresh air is supplied into the room on suitable days.



CONTINUOUS PROOFER is divided into zones controlled by these two-pen wet-and-dry bulb electric contact thermometers. (Foxboro photo)

SPONGE temperature is taken at Fox Baking Co. by a probe-type resistance bulb. Post-mounted Leeds & Northrup Instrument maps temperatures. Technic assures bakery of more uniform batches.

will provide a suitable average of mixer-power consumption.

In view of the need for continuous dough mixing, these late developments in temperature and consistency measurements are very timely. Actually, they should act as a stimulus to continuous mixing. Parallel evolution of other food processes show that the success of any continuous operation depends primarily on properly controlled variables.

Precision Fermentation

Once properly mixed, dough next faces a chance of "crippling" during fermenting and proofing. But studies of the effect of yeast on fermentation at various temperatures and humidities has removed this process from the trust-to-luck stage. By utilizing well-engineered air conditioning and simple control technic, fermentation unsalables should be eliminated.

But the fact remains that huge yearly losses still occur because of improper conditions during proofing and fermenting. And the simple solution is—precisely maintained temperature and humidity schedules.

A progressive step to correct this situation has been the integration of controls into dough-room design by manufacturers who, by incorporating wet and dry bulb controllers and exact-sized valves into their systems, have given the baker a chance for 1 deg. temperature tolerances in the dough room.

A look at a typical air-conditioned dough room will show how instruments fit into the setting. Air-conditioning equipment in, or just adjacent to, the room usually comprises (1) a series of water sprays, (2) baffles to eliminate excess water in the atmosphere, and (3) heating coils to warm the moist air before it is blown into the room.

A cooling section is added to a fermenting room for chilling spray water, whereas proof boxes usually do not have this unit because proofing is carried out at an elevated temperature.

A two-bulb, dual air-control thermometer is used in the fermenting room. One bulb is enclosed in a continuously moistened wick to measure wet-bulb temperature of the room. And a control element in the instrument—linked with this reading—regulates the humidity. The other bulb measures and controls the temperature.

Best location for the two bulbs is in the air duct returning to the conditioning unit. For here there is good circulation and one can readily find out what has happened to the air previously blown into the room.

Diaphragm control valves are installed at three points. Two are in the steam line—one regulating air-heating coils and the other supplying heat, when needed, to the spray-water tank. The third valve is in the coolant line, which lowers temperature of the spray-water tank, if required.

How It Works

An increase in the humidity of the fermenting room will raise the wet-bulb temperature as the atmosphere nears saturation. Then, the controller will increase the flow of brine, thus reducing the water-spray temperature. Condensation of excess moisture in the returned air will lower its humidity to the proper value.

In the reverse situation—when air humidity gets too low—feeding of more steam to the spray-water tank will permit the return air to absorb moisture as it passes through the conditioning unit. Temperature changes, however, are simply dealt with by dry-bulb control regulating the steam to air-heating coils.

Many interesting twists can be added to increase efficiency of this basic fermenting-room control system. For example, outside air, when it is cool enough, can be injected through an automatic damper to replace warm moist room air. A thermostat located

outside the room and tied into the system through a relay, automatically switches from refrigeration to air cooling when weather permits.

But the installation of well-engineered controls may not be the complete answer to satisfactory fermentation. Poor room insulation, allowing cold spots for moisture to condense, could undo all the good by contaminating the product. Or, poor air circulation through an improperly designed room could make controller-bulb locations meaningless.

Proofing Instrumentation

Proof-box control is similar to that used in the fermenting room. But in the absence of cooling problems, the wet-bulb only regulates the amount of steam going to the spray water set-up. Continous proofing employs the same basic control approach, but the proofer is zoned off so that several instruments take charge throughout the length of the unit. In this way, a variable control of zone conditions can be exerted, if desirable.

While proper control of dough-room atmosphere is a positive check over the way fermentation proceeds, it is not the whole answer. For in the final analysis, it is the dough temperature itself that tells whether conditioning and fermenting is going ahead as planned.

Remote Temperature Control

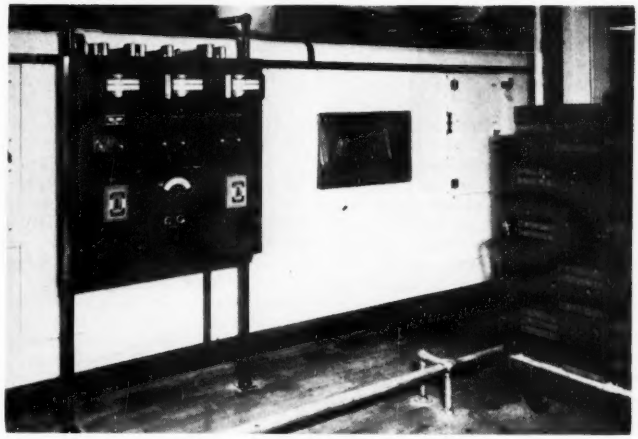
In recognition of this, there has been developed a new system of remote dough-temperature reading that can act as a master check on fermentation and other dough handling. Involved is a sanitary probe-type thermocouple, or resistance bulb, for dumping into the dough trough. Leadwire from this bulb is run out of the dough room to a remote indicating and recording electronic instrument.

This system provides a continuous record of dough temperature accurate to within 0.5 deg. F. Easily included is a light or buzzer-alarm system for warning an attendant when the temperature of the dough deviates from normal.

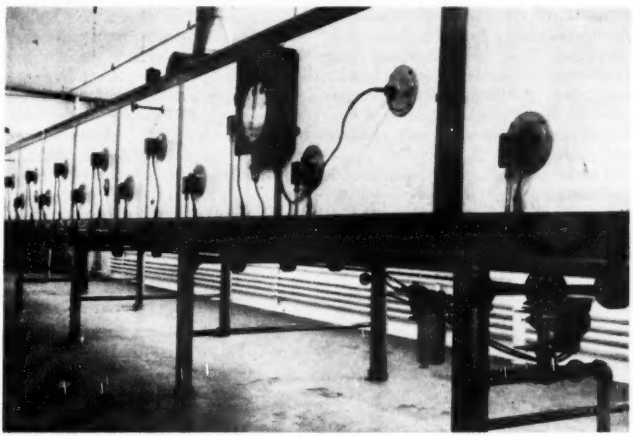
In fact, one baker has set up a multiple-recording unit that provides, on a single chart, in-dough measurements at points throughout his plant.

Another interesting use for this new technic is in the logging of critical steps when making bread by the sponge method. A portable, dunking, resistance bulb and strip-chart recorder is used to check temperatures of every sponge batch in three routine steps: (1) When sponge is mixed, (2) after sponge has undergone fermentation, and (3) following mixing of the dough.

Chart analysis has resulted in much greater uniformity between batches. For one thing, it has permitted standardization of the rate at which the temperature of the sponge rises during fermentation. And it has spotted inefficient production delays that could subsequently be eliminated by more careful planning.



HIGH-LOW electric control of three-zone traveling oven originates at this central panel that includes pyrometers and tachometers. (Burny Bros.)



PNEUMATIC CONTROLLER and associated diaphragm valve at lower left supply regulated amounts of air and fuel to burner. (Griggs Cooper Co.)

Oven Controls Evolved

Most bakeshop cripples had occurred in the oven. Temperatures of old-fashioned peel and draw-plate units were difficult to control. Their high baking chambers and awkward flue dampers encouraged spotty heat distribution. And even the fairly satisfactory instruments of the time could not correct such conditions.

Today, oven cripples are disappearing. Excellently designed traveling-tray and tunnel-type ovens, with integrated protective instrumentation, are now available. The lower baking chambers and vastly improved heating efficiency of such units are a natural setting for modern automatic control.

But instrument systems are still being evolved in an effort to match modern-oven performance. For example, the balanced temperature gradients of a multiple-zoned oven require very close control to be effective. And the increasing tendency to use the same oven for a variety of products necessitates equally versatile instrumentation.

Continuous baking provoked the first basic changes in oven control concept. The old "on-off" type of controller was found inadequate. A modulating or proportional control of

fuel to burners was needed to match oven "load" at every moment.

First step in this evolution was the development of "high-low" firing. An additional electric control contact was placed in the instrument and a two-position motorized valve in the fuel line. When oven temperatures rose a few degrees above control setting, the high instrument contact would drive the valve to a predetermined low-flame opening. And when the temperature dropped below the control point, the low contact would send the valve back to full-flame position.

High-low control greatly reduced temperature cycling and, in most ovens, provided effective zone control within 5 or 10 deg. It also removed the wear and tear due to constant relighting of burners.

But even this improvement could not harness the temperature dynamics of the new, high-capacity continuous baking units that appeared shortly after World War II. So, the more flexible medium of pneumatic control was tried. This meant changing from thermocouple-actuated millivoltmeter controllers to filled-system thermometers (the former method had too little operating torque to accommodate air control mechanisms).

Throttling-type pneumatic control provided a definite improvement. Accurate positioning of air-operated fuel control valves narrowed temperature fluctuations to within a few degrees. And ease of instrument adjustment quickly adapted this control system to oven product changes.

Electronics Promote Progress

While changing to air-control thermometers (in adapting instrumentation to the modern continuous oven), certain advantages of previous electrical systems were lost. Thermocouple-temperature sensing is more flexible and responsive. Average temperature in a zone can be gaged by a parallel hook-up of several strategically located 'couples. And long leads could run between instrument and element to aid central-panel control.

Similar advantages could also be claimed for electric-control valves. Conduit run wiring between controller and valve is a neat, trouble-free substitute for air tubing.

Modern electronic pyrometers have started a trend back to electric-control techniques. These thermocouple-actuated units are endowed with a powerful measuring torque. Not only can they operate conventional air-control mechanisms but they also provide a form of electrical proportioning-control action.

Proportional control has the advantage of small valve movement per small temperature change. Electronic controllers accomplish this electrically by moving a wiper arm over a calibrated resistor as the temperature changes. A similar resistor (part of a bridge circuit) in the control-valve motor is brought into balance with the new instrument reading through repositioning of the valve motor. Thus, the motor movement opens or closes the fuel valve slightly in proportion to temperature change.

Several bakeries have already taken advantage of electronic pyrometry. But these installations mainly have used the air control technic. Complete electric systems have not taken hold due to the need for a reset function in the system to compensate for oven-load changes. Electrical devices needed for this purpose have been rather bulky and also very expensive.

However, recent progress in electric control design has remarkably simplified such equipment. In fact, there have appeared ingenious new low-cost electric components that may seriously contest the great acceptance of pneumatic technics throughout industry.

Controlled Baking Time

Continuous methods have dramatized another critical oven variable—baking time. Fraction-of-a-minute variation in a high speed band oven can affect a lot of goods.

Since baking time relates directly to conveyor speed, most traveling ovens are equipped with indicating tachometers geared to the chain drives. Here, the instrument scale simply correlates drive rpm. with time of product movement through the oven.

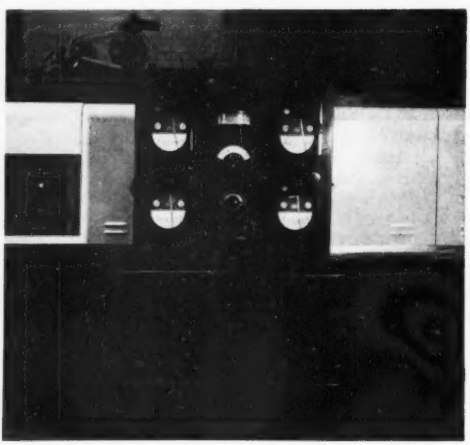
Recently, electronic recorders that are similar to the bake-oven pyrometers (previously described) have been set-up as baking tachometers. They provide a very stable and accurate measurement of oven speed and a control record for checking against production.

Electronic tachometers can, through built-in control, automatically regulate baking time. Thus, a period of anywhere from a few minutes to over an hour's oven time can be pre-set on the instrument at its central location. Automatic adjustment of the oven-drive mechanism will confine baking time to the set value.

A noticeable recent trend involves centralizing all oven control on a single panel. Such an arrangement particularly eases the supervision of modern band ovens, which frequently stretch over 100 yd.

A typical panel for a four-zone,

ELECTRONIC potentiometers control zone temperatures in this band oven. (Carr Consolidated Biscuit Co. photo)



OVEN-CONTROL panel at General Baking Co. has 4-zone controllers, multi-'couple check system, and speed indicator.

traveling-hearth bread oven has four indicating air-control thermometers (one for each zone), an indicating oven-speed tachometer, one indicating zone-temperature pyrometer, and a 12-thermocouple selector switch.

In this type of oven, thermocouples are spotted through each zone to check heat distribution and controller accuracy. A single pyrometer allows a rapid scan of all 'couples through a rotary selector switch. In some cases this check system involves a multiple-recording pyrometer, with continuous comparison of all oven zones provided on one chart.

Packaging Protection

It's hard to believe, but instruments still haven't finished their bakery job even after the successful convoy of product through mixer, fermenting room, proofers and oven. Now, a new technic for curbing packaging cripples has appeared to give a proper "finishing touch" to bakery instrumentation.

First, a word about packaging cripples: If bread is packaged too hot, moisture condenses inside the wrap. This condition is not only unsightly, but is also encourages mold growth. As a result, the baker is faced with a "return" problem.

To lick this poser, one bakery now employs a sharp pointed, needle-diameter thermocouple to insert into bread without damaging the loaf. Teamed with a high-speed electronic recorder, this bread-probing technic gives an accurate picture of internal product temperature within 2 sec.

BREAD-TEMPERATURE check, quickly determined by needle 'couple and wall-mounted instrument, spots loaves too hot to wrap at Federal Baking Co.

The 'couple is suspended from a pulley over a weighing scale alongside the loaf conveyor feeding a wrapping machine. As samples are taken from the line for weighing, they are also "probed." The procedure permits a maximum flow of bread from oven to wrapper without danger of hot packaging. And it has possibilities in checking the temperature of other types of baked goods.

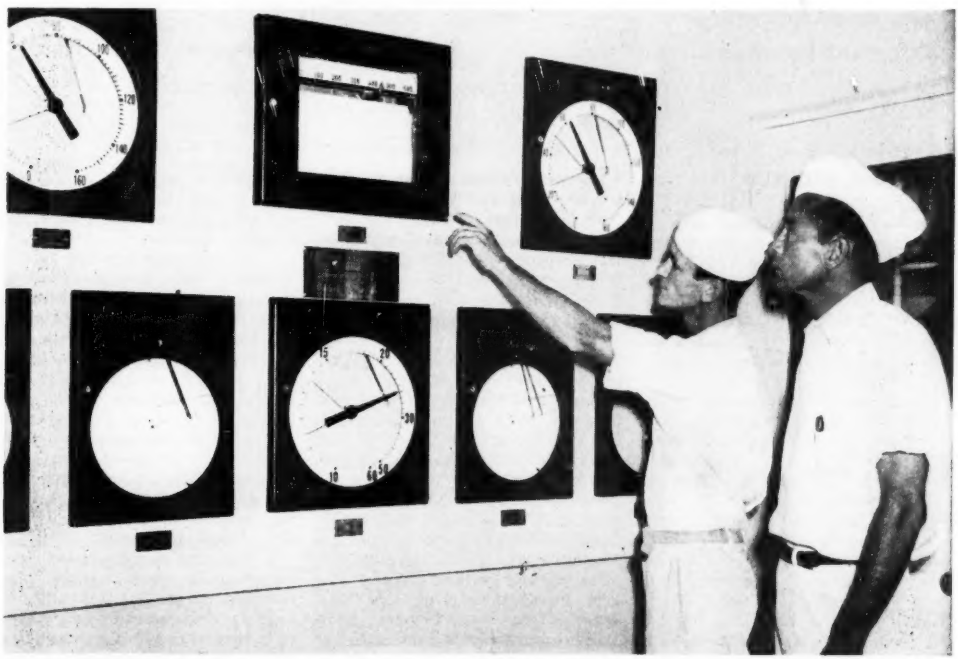
Remote Control Baking

Alpha and omega of all instrumentation is the central-control panel. A remotely housed, integrated formation of instruments epitomizes the skillful job the units are called upon to perform.

So, the appearance of several such installations—even those just for process recording—seems to indicate that instruments are finally "coming of age" as an established technic in bread bakeries.

One bakery's central recording station, for example, is located in the plant superintendent's office and registers conditions hundreds of yards distant. It graphs, on a battery of electronic recorders, (1) temperatures of zones in all ovens, of dough in mixers, of ingredient water; (2) temperature and humidity in all proof boxes; and (3) speed of bread ovens and dough mixers.

Very little instrument technology separates such thorough remote supervision from active and complete remote-process control. So be prepared soon for an instrument-mechanized baking that will rival the most advanced of our robotized process industries.



BAKING-PROCESS panel records temperatures in oven, dough, proofer, water, and fermenter. (Fuchs Baking Co.)

GEOGRAPHICAL SEPARATION of plants requires close planning for uniform control. This is Hoopeston, Ill., unit

How Coordinated Expansion Secures

Top Label Foods at Low Cost

In growing from 4 to 63 plants in 30 years, Stokely-Van Camp had to grapple with—and lick—numerous problems involving organization, plant layout, and scheduling. Revealed here is how the company did it — winning "the greatest advantages from the most opportunities"

ALFRED J. STOKELY
Assistant to the President,
Stokely-Van Camp, Inc., Indianapolis

Substantial operating economies have been made at Stokely-Van Camp, Inc., during the past few years. And many of these gains have been achieved by doing something about layout of physical facilities and about organizational problems.

Since the 1920's, our company has increased its sales from less than a $1,000,000 per year to approximately $100,000,000 per year. The increase in productive facilities that has made this increase in sales possible has been brought about principally by acquisition and merger of existing canning plants and organizations. During this period, our plants have increased from 4 in but one state to 63 in 15 states, Hawaii and Canada. This "merger and acquisition" method of expansion into more than three score plants has had the following definite advantages:

- **Most of the plants were acquired on a much lower cost basis than their replacement cost.**
- **Along with retention of profits in the business, we have been able to increase our capacity a hundredfold without resorting to any extensive financing from the outside capital markets.**
- **We have been able to obtain plants in proved growing areas.**
- **Most of the plants are moderate in size so that if the immediate growing area "plays out", or for any reason raw produce cannot be secured at a reasonable price, or labor conditions are unsatisfactory, our company is in a position to switch production from this plant to more attractive areas, or else eliminate the plant entirely without causing too much loss in financial investment.**
- **The hazards of complete crop failure are reduced to a minimum because of having many different plants in many different areas.**

Coupled with these very definite physical and financial advantages, our company has had to meet the following problems:

1. In acquiring new plants we have ordinarily taken over the personnel in the plants and therefore have had a real problem of supervisory training and indoctrination in our methods.

2. Because many of our plant managers and divisional managers were independent operators in the past, it has been best to give our plant manager final responsibility for the overall operation of his plant, with our general office giving extensive help and guidance through a staff engineering, quality control, personnel, and agricultural department.

3. The large measure of individual responsibility given to the plant manager, and the fact that each plant as it was acquired had different types of equipment, made it necessary that our general office engineering department exercise tight budgetary control

over expenditures for new equipment and maintenance and repairs. The aim here is a gradual shift to uniform equipment, while initially placing new equipment where it is most needed and will bring the most return in dollars saved or quality improved.

4. Having many different plant organizations, all with different ideas of quality, has forced us to maintain the strictest control out of the general office with regard to quality and grading of final products.

During the World War II period of greatest expansion, our company met these problems as best it could, and of course many mistakes were made. It has been only in recent years that a formalized program directed out of our general office has been instituted. During this period we have consciously consolidated our production gains with the idea of taking what we have and running our plants so as to give our customers a maximum quality product at a competitive price and at the same time return a maximum long term profit to our company.

Coordinating Program

In order to gain these objectives our manufacturing division has instituted what it likes to call "The Five Point Program." The watchword of this program is "higher quality at lower cost," and the emphasis is all toward producing in volume a larger percentage of fancy merchandise suitable for the "Stokely Finest" label.

The program represents a coordination of work on the part of five general office departments as follows: 1. Agricultural, 2. Quality Control, 3. Industrial Engineering, 4. Supervisory and Employee Training, and 5. Engineering and Scheduling.

Theory of the program is that we will start with our agricultural division in obtaining a higher percentage of quality product. Then we will maintain this higher percentage of quality product through all plant operations by coordinating harvesting schedules with a well balanced plant layout and operation. Such coordination requires controls over labor costs and raw material usages through our industrial engineering program, with a close quality control program instilled in the whole organization, through training from supervisor to line worker.

The whole program starts when our Operations Planning Committee, early in the year and long before contracting begins, decides what the production quotas will be for our various producing areas. This decision is based upon the needs of our sales department and management's best estimate as to the overall industry production of each canned fruit and

Planned from Grower to Warehouse

LOCAL FIELD men at each plant work with growers to improve quality and yield of raw materials and to time planting to provide a smooth harvesting.

QUALITY standards are explained to plant superintendents, foremen, and floor ladies by general office staff at supervisory training meetings.

ENGINEERING developments have been especially apparent in warehouse layout and palletizing. This is a portion of Indianapolis warehouse.

vegetable item. Our executives lean heavily upon the analyses and projections of the market research staff in arriving at this estimate. Determined are the activities of our organization for the coming twelve months.

With the production quota set, the various departments of our manufacturing division—Agricultural, Quality Control, Industrial Engineering, and Engineering and Scheduling—get together and decide where the quota can be most advantageously produced.

Each year this means that the showing of each individual plant in an area is evaluated in terms of quality, low labor costs, low material usage, warehousing and indirect expenses. We have expanded greatly our industrial engineering and cost departments in order to be in a position to give accurate studies of the performance of each plant.

Plan Year's Operations

Although our industrial engineering department has effectively carried out such procedures as laying down production standards, crew lineups, and standard methods for each production operation, and has instituted control reports over our plant labor efficiency and ingredient usage, we have felt that our greatest cost reductions and quality improvements have come from the basic planning for the year.

Through this annual meeting of our top production staff and through our studies of each plant's performance, we are able to assign quotas at the plant that normally can obtain fancy merchandise at a reasonable cost. In addition we can plan to place sufficient production at that plant so that it will have full and continuous runs. At the same time, we keep to a minimum the assignment of pro luction quotas to those plants where the physical plant layout is poor and cannot be easily changed, or where the growing area is poor and will not allow continuous runs of quality raw produce.

This planning procedure involves making a survey of every production line at each plant. From these surveys, capacity charts are plotted for each piece of equipment. Thus the overall plant capacity can be related to the probable acreage that can be secured in the plant area. If it appears that the plant area is a good growing area and ample volume of produce can be secured at reasonable prices, the next step is for industrial engineering, in conjunction with mechanical engineering, to determine what plant equipment changes are necessary to strike a balance between the raw products available and the running of the largest volume possible.

Volume, of course, must be commensurate with the constant to obtain a higher percentage of fancy product, which is the type of merchandise we must have for our Stokely Finest label.

The surveys enable us to make up our annual capital expenditures budget for new equipment. In this way, we can make sure our new equipment is placed in those plants where it will bring the greatest improvement in cost reduction and volume increases of quality merchandise.

Final decision of this meeting may be that some plants will not receive any budget allocation for new equipment because of unfavorable factors, either in physical layout and condition of present equipment or in the growing area. Other plants may be completely overhauled so that volume can be greatly increased.

It may be that at some plant, running a particular commodity, the raw product is unfavorable. We may, therefore, eliminate that commodity from the plant, or if all commodities produced by a plant make an unsatisfactory showing, the operation of the plant may be discontinued entirely on all products. We have done this in at least three plants during the past three years, moving the equipment to other areas where we were able to get raw products of the quality we wanted and at reasonable prices. This switch in production in most cases paid for itself, through savings, the first year.

Production Assigned

Our annual basic planning procedure enables us to assign to each plant the number of acres of produce that must be contracted to give the maximum efficiency, taking into consideration the capacity of the equipment at that plant. At this point, it is then up to each manufacturing division to carry out its part of the five point program. Our agricultural division supervises and works with local fieldmen at each plant so that they time their plantings to provide a smooth harvesting schedule. In this way we minimize delays in handling the raw produce from the field to the plant, as well as gluts that might result in processing delays and consequent loss in quality.

We have changed our contracting procedure so that we encourage a delivery of higher quality raw product. This has been done by adjusting our growers' contract so that it pays the grower to deliver us the highest quality. This year we have raised our price particularly on the higher grades, leaving the lower grades at the same price or lower. This is especially true on peas, where we buy on tenderometer readings, and on tomatoes, where we buy on a graded basis.

Quality Bonus

Into certain of our contracts we have put clauses that encourage the growers to use better fertilizing methods and to apply insect and disease control methods. For instance, in our tomato contract we are paying a bonus this year for all tons of tomatoes grown over and above five tons per acre, which happens to be the average tonnage received by all growers in Indiana last year. We feel this bonus paid to the grower for high-yielding acreage will enable us to get the better land and will encourage the grower to fertilize heavily and dust properly. Ordinarily, higher-yielding acreage also will give us a higher percentage of No. 1 Tomatoes.

Although in the past we have purchased the greatest part of our raw material through grower contracts, we have recently gone into more farming by leasing land and allowing our agricultural division to farm this land. We feel many of the practices that we are recommending to our growers can be proved to them in this way, while, at the same time, we are able to continue the development of better practices.

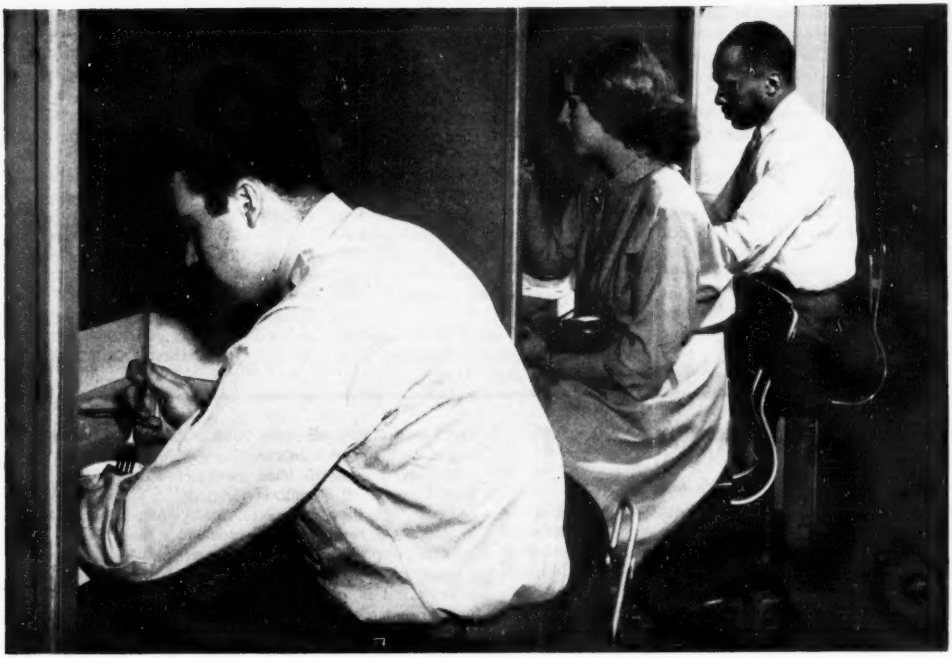
In order to control our harvesting so that we obtain our peas and corn at the peak of quality, and in order to allow our plants to work on a smoother schedule, we have invested heavily in pea harvesters and corn harvesters. Dusting and insect control equipment has been purchased because we feel the average grower cannot afford to buy this equipment, whereas the canner can do it and charge back the cost to the grower.

Last year was the first year we received tangible returns from our expanded agricultural program. The fact that Stokely's packed a higher percentage of fancy merchandise last year than ever before in its history was due in large measure to the efforts of our agricultural department and fieldmen. Inasmuch as it costs very little more in the plant to produce fancy merchandise than it does lower grades, and inasmuch as the fancy merchandise will bring considerably more dollar value per case, any increase in the fancy production is equivalent to drastic cost reduction.

Planned Processing, Too

Assuming that our agricultural division by working with each individual plant manager and fieldman is able to lay at the plant's doorstep fancy raw material, it is now up to our quality control department to see

(*Turn to page* 153)



CONSUMER PREFERENCE TESTS correlate closely with Dilution Numbers of new technic, indicating validity.

New Flavor Evaluation Method

Gives reproducible results, reflects consumer preference

Developed for dried milk, procedure employs special panel selected for skill in detecting small differences between two samples. Applicable to other products, too

DAVID R. PERYAM, DONALD V. JOSEPHSON, ROBERT J. REMALEY and HARRY L. FEVOLD

Messrs. Peryam and Fevold are with the QM Food & Container Institute; Messrs. Josephson and Remaley are associated, respectively, with Penn State College and the Kraft Foods Co., Chicago.

A new method for evaluating the quality of dried milk, bidding fair to predict the consumer's reaction more accurately than conventional taste panels, has been developed at the Quartermaster Food & Container Institute, for the Armed Forces, Chicago.

Although the investigation is still in an early stage, results thus far have been very satisfactory.

- **Exceptionally good reproducibility was obtained when the same samples were tested and retested one to four weeks later.**
- **Also, initial experiments have shown good correlation between ratings by this method and consumer preference.**

Although the method is discussed here only in relation to the dried milk problem which initiated the work, its potential application to flavor problems arising in the production of other foods will be readily apparent to many readers.

It could be of value wherever a logical physical standard of assured consumer acceptance now exists or could be established. This might include, among other products, fruit juices, beverage powders, and dried eggs. Dilution technics have already been used in research work on the latter product.[1]

In this new method, an index of quality called "Dilution Number" (DN) is set up. It is defined as "Percent of reconstituted dried milk in a mixture of that material with a fresh whole milk standard such that the difference in taste between it and the standard lies just above the threshold."

The objectivity of this index will be apparent. It is defined in terms of readily duplicated operations, except for determination of the critical difference point, or threshold—that is, the degree of difference which is barely detectable.

Theoretically, the exact method used to find this point is not essential to the validity of the index, but precision of the DN will depend upon precision of the threshold determination. The duo-trio test[2] (Fig. 1) with a total of 20 judgments from five to ten observers is used to determine the threshold.

This test involves only two milks at a time. The observer is given a sample of one of them as a standard, followed by two more samples presented successively in unknown order, one of which is identical with the standard and the other, the second member of the pair. The observer must say which is the "different" sample.

For each dried milk, a series of mixtures of reconstituted and fresh milk is made up. For good quality samples, step differences between the mixtures of as much as 5 percent of the reconstituted milk may be used, but they will vary down to less than 1 percent for the worst samples.

Mixtures are tested one after another for difference against fresh milk, starting with the dilution estimated to be nearest the threshold and proceeding to adjacent ones, up or down the series as necessary, until a test results in 15 correct judgments out of 20. It can be shown that in this situation 15 correct judgments is the lowest number that gives statistical certainty of a difference, and it is used as the criterion of difference for that reason. If no dilution results in exactly 15 correct, the DN is found by interpolation (as shown graphically in Fig. 2).

An objection which may arise to the use of this index is that fresh milk itself is not constant in quality. Note, however, that absolute constancy is not demanded; it is only necessary that flavor of the standard remain about the same sensory distance from that of dried milk. Off-flavors in the standard like those of dry milk would raise the DN, or a lack of flavor would lower it. This danger is mainly theoretical, though, for it would not happen frequently that minor variations in the fresh milk standard would be in one of the directions that might cause trouble.

Another possible objection is that there may exist very light but strongly objectionable flavors which are easy to hide by dilution; and, conversely,

Panel Approach Weighed

Utility, rather than quality, has always been the major advantage of dried milk. Certain markets are assured on the basis of this characteristic alone. But holding others is dependent upon maintaining a certain level of quality, and vast new ones would be open if the product could be improved enough to compete with fresh milk. Considered in the light of these facts, quality varies greatly and is often inadequate.

Since not even the best process control can assure constant good quality, and since chemical and physical tests of the finished product cannot accurately measure this factor, direct sensory evaluation must assume an important role. Here, such an approach cannot be considered a frill—instead, it is a vital necessity. Many responsible persons in the industry are aware of this, hence, flavor evaluation has had considerable attention.

One method has become almost traditional. This is the so-called "panel method," in which a small group of persons, operating on the basis of expert pre-knowledge, assign samples to points on a scale representing quality categories. Such scales usually have 10 to 15 points, described in general terms indicating degrees of excellence. Ratings assigned by individual judges are averaged to get the final "flavor score." Frequently certain measures are taken to control erratic judgments—for example, the discarding of ratings that differ from the mean by as much as one scale unit.

But how judge a method's ability to do the job?

Briefly, we believe that to prove adequate in the dried milk industry, the method must: (1) Differentiate between samples of varying quality, (2) be able to predict consumer acceptance, (3) be meaningful to others in the industry, and (4) give results that are reproducible.

How Does Panel Method Measure Up?

Let us weigh the panel method, pointing out difficulties and dangers, but also suggesting improvements—and keeping in mind that the criticisms do not apply equally to all panels:

1. Nearly all panels, without regard to method, can differentiate between samples and assign an order of excellence, provided the level of difference is high enough. But there still is the matter of comparison with precision possible with other methods, also checking of results against some practical use requirement. However, such subjective tests are known as the least precise of the psychophysical methods. Again, when the judges' opinions as to excellence vary, even though all agree there is difference, the averaging of scores may hide the information.

2. Final purpose is good consumer acceptance, and we should expect all standards for judging to take this into account. It is here, we believe, that the panel method courts its greatest danger. It must assume that the standards used by a few especially interested persons, when compounded, adequately represent the consumers. Which they may. However, it is precisely those persons usually found on panels—namely, experts—whose criteria for good quality are most likely to diverge from those of the consumer. For, all too often, these standards are affected by their knowledge of the production process and production difficulties, and by their desires and prejudices.

3. A flavor score, removed from its immediate context, means little. Even though two panels use the same scale and have members equally qualified, they are likely to produce different scores on the same samples. Hence, such scores mean but little to customers or even to other scientific workers. Sometimes they mean little even to the same group at a later date.

The reason, though easy to find, is almost impossible to eradicate; for it lies in the nature of the psychological processes used in the act of scoring. This involves, not only relatively simple sensory perception, but also the remembering of a host of similar events from the past as a frame of reference, a sustained awareness of consumer standards, and an act of critical evaluation of the present experience in relation to both the past experience and the standards. Any activity of such complexity is unstable, being subject to accidental variations of many kinds, such as faults of memory, autosuggestion and, particularly, suggestion from external sources. Moreover, there are seldom physical reference standards to help keep judgments in line. Consequently—and this is something we should always remember—panel scores frequently describe the judges better than they do the samples.

4. The foregoing applies as well to reproducibility of results of a given panel. The standards of individuals are subject to unpredictable variation, and those of a whole panel may drift because of some common influence.

QM Lab Test Panel Pin Points Weaknesses

Data from the Quartermaster Subsistence Laboratory is illustrative. In 1944, samples from dry milk purchases throughout the country were found highly variable in quality, hence a panel was set up to try to find out what plants or processes were responsible. Panel members were classed as "milk experts." All were interested in the success of the venture.

The accompanying table presents a sampling of the data.

strong but pleasant flavors which are persistent and difficult to hide. In the first instance the result would be a DN too high to reflect true quality, and in the other a DN too low. However, the consumer's criterion is fresh milk, and he usually objects to an off-flavor in proportion to its strength. Fortunately, this point is open to experimental test, and so far neither difficulty has been encountered.

Checks Prove Its Value

But the two questions of paramount importance are: (1) Is the DN reproducible, and (2) does it reflect consumer acceptance?

Eleven samples of milk powder were investigated in an initial test of the method. They were commercial samples, some of which had been stored up to four years, and probably represented the entire normal range of quality. DN's were determined for each sample and redetermined from one to four weeks later. To test for consumer preference, 40 untrained observers rated each sample on a 9-point scale showing degrees of "like" and "dislike." The samples were also rated by a 17-member panel selected and trained at the Institute to judge milk quality. This panel operated under conditions of good laboratory control but used a 10-point quality scale of the traditional type. Results are given in accompanying comparisons table.

Columns *a*, *b*, and *c* give the first, second, and average DN's. Column *d* gives the consumer acceptance in terms of mean ratings for the group, when the points on the scale have been assigned values from 1 to 9, starting at the poor-quality end. Column *e* shows the mean ratings by the panel using assigned values for the scale points from 1 to 10, starting at the poor-quality end. Critical correlation figures are shown at the bottom of the table. Correlation between the two DN determinations is +.96, which shows exceptionally good reproducibility.

Compiled by a research group that later worked on flavor evaluation at Ohio State University under Dr. D. Josephson, it shows the ratings assigned by three of the judges to about 500 samples each. This panel was using a 15-point scale of a type quite common in the scoring of milk flavor.

Remember that these samples were a cross-section of a production so poor and so variable that it was causing trouble. Every possible quality was represented, and certainly a good number of the samples were of low quality. Yet almost all samples rated 7, 8, or 9 on the 15-point scale—93.1, 94.3 and 95.4 percent, respectively. This amounted to a denial that there was any trouble, and so failed to point the way to a solution. These data proved typical, and the experiment was abandoned as a failure.

The research group suggested that such results are due primarily to: (1) The practice of throwing out ratings deviating more than a specified amount from the average, which induces excessive caution by the judges, and (2) the existence of a "central figure" in a panel group whose decisions are accepted by, or forced on, the others as a pattern, which again reduces variability but wastes the skill of the judges.

Note that these two causes are but special manifestations of instability of criteria, as discussed above. To avoid the bizarre consequences of leaving judges to their own devices, drastic measures are used to achieve uniformity. The judges may respond so wholeheartedly that little is left but agreement.

Yet, we still believe that panel methods may, and should, be kept because of their ease of operation. However, it is certainly incumbent upon all users to handle them carefully and to effect any improvement possible.

Statistical Methods Not the Answer

Many have sought a solution in the use of statistical technics—such as tests of the significance of differences, critical evaluation and selection of judges and scores, correction of scores for constant errors, or the use of standard scores. However, this approach must assume that the data are fundamentally sound, which is frequently not true, and no amount of calculation will change the basic character of bad data. Statistical methods here, as elsewhere, are but an efficient tool. It is foolish to look to them as a cure-all.

The most fruitful approaches to improvement would seem to be selection and training of panel members and rationalization of methods.

The Ohio State research group concluded that scales generally used are too long. One of such length as 15 points exceeds the powers of discrimination of most judges and causes confusion and variability. It was also pointed out that the type of judgment called for is equally, or even more important, than the length of the scale. The test should present a meaningful, solvable problem.

The more firmly the intended criteria are fixed in the judges' minds, the less subject the ratings will be to accidental variation and to suggestion or psychological pressure from outside. This calls for a more tangible classification than the simple "degrees-of-excellence" usually employed. Proposed was a 6-category use-classification system with quality grades defined according to use for which the milk is suitable (accompanying table). These classifications would still permit much difference of opinion, yet also are carefully defined as to taste properties in each class.

The group's study of the psychological elements important in tasting and judging dried milk, and of methods of developing judges' skills, resulted in a procedure with these essential points:

1. Judges are selected by experimental test of sensitivity to important flavors.

2. They are carefully trained in observing and reporting, particularly in terminology applicable to the sensory qualities that might be aroused.

3. Judges report only their sensory experiences, and the experimenter evaluates the data. This reduces demands on the judge to what is psychologically reasonable by relieving him of the responsibility of synthesizing his experience immediately into a score.

4. Careful control is maintained of testing variables—quantity and temperature of samples, time interval between samples, time order of samples, adaptation and fatigue of judges.

Practical considerations demand that these panels be small. Groups so developed have proven particularly valuable for research work. However, they have not as yet been used in routine flavor scoring, so we cannot say how much superiority for that purpose might be gained.

SCORES Assigned to Poor Quality Dry Milk Samples Show Weakness of Taste Panel Method[1]

Score	Judge X[2]		Judge Y[2]		Judge Z[2]	
3	—		—		0.2	
4	0.4		0.2		—	
5	1.6		1.4		1.6	
6	4.3		3.9		2.8	
7	12.7		15.6		16.1	
8	64.3	93.1	45.6	94.3	53.5	95.4
9	16.1		33.1		25.8	
10	0.2		0.2		—	
11	0.2		—		—	
12	0.2		—		—	

[1] Reference 4, end of accompanying article.
[2] X = 564 samples, Y = 441 samples, Z = 501 samples

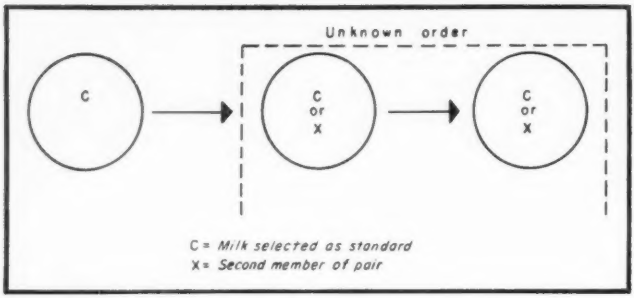


FIG. 1. HOW duo-trio test works. Observer is given a sample of control (C) followed by a pair in unknown order. One is the same as (C) but the other (X) is different. It is his problem to say which is the "different" one. A total of 20 judgments from 5 to 10 observers is used to obtain the threshold dilution, the starting point for DN determinations.

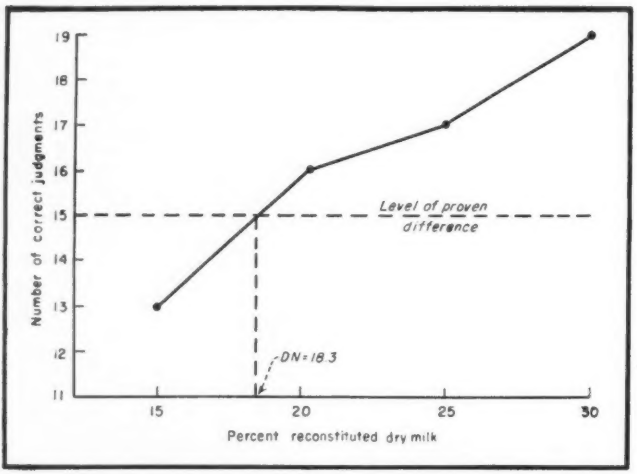


FIG. 2. DETERMINING Dilution Number: Mixtures of reconstituted dry milk are checked against fresh milk, starting with a dilution where the difference is barely detectable and proceeding to adjacent ones, until a test results in 15 (or less) correct judgments out of 20. The DN is found by connecting the points (solid line) and interpolating (dotted line).

COMPARISONS Show How Dilution Numbers Predict the Consumer's Reaction

Sample Code	Dilution Number: First Deter *a*	Dilution Number: Second Deter *b*	Dilution Number: Average *c*	Consumer Acceptance [1] *d*	Panel Rating [2] *e*
A	30.0	32.5	31.2	4.9	5.9
B	27.5	25.0	26.2	4.6	6.7
C	25.0	22.5	23.8	5.2	6.9
D	22.0	25.0	23.5	5.1	4.9
E	23.0	22.5	22.8	4.7	6.8
F	23.0	20.0	21.5	4.5	4.1
G	19.0	23.0	21.0	3.6	5.9
H	13.0	15.0	14.0	4.4	3.9
I	10.0	14.5	12.2	3.2	3.8
J	8.5	8.0	8.2	3.0	2.8
K	0.3	0.5	0.4	2.4	1.6

Product moment correlation between *a* and *b* = +.96
Rank order correlation between *c* and *d* = +.89
Rank order correlation between *c* and *e* = +.82

[1] 9-point "like-dislike" scale
[2] 10-point judgmental scale

The most significant figure is the +.89 correlation between the DN's and the consumer preference ratings. This means that the DN predicts the consumer's reaction efficiently and is therefore valid. The panel's placement of the samples, in this instance, correlates better than usual with consumer preference, although not as well as the DN.

It is evident that the procedure followed here would be too slow to handle samples on a production basis. This could best be done by establishing as a standard a DN figure which would assure the quality desired. This DN might even be specified to the customer, but more likely would be set as a voluntary control standard by management. Then it would be necessary to check a given sample only at the dilution required by the standard to make sure that its DN did not fall below that point. If it failed to pass, further work could be done to find out what standard it could meet.

Categories Suggested

Dilution Numbers could be used to give more exact meaning to certain grading systems already in use—such as the following, which was developed on the basis of research work previously done for the QM Container Institute[4]:

Premium grade	DN 50 and above
Choice grade	DN 30 to 49
Standard grade	DN 20 to 29
Commercial grade	DN 12 to 19
Baker's grade	DN 7 to 11
Feed grade	DN 6 and below

Experience with this index so far indicates that the definition of "Premium Grade" given above is unrealistic in that a DN of 50 is unlikely to be found. The highest single value so far established has been 32.5 (see table).

The method is not yet ready to be offered as a finished technic for use in quality control of production. In order to achieve better verification of the theoretical background, correlation of the DN with consumer preference should be investigated more thoroughly, especially in regard to typical off-flavors of dried milk. Changes in DN corresponding to significant changes in consumer preference should be determined. Experimental work would be necessary to establish the minimum DN's of milk suitable for various uses. The figures shown are merely guesses.

Further, when the flavor quality of the product approaches near enough to that of the standard to enter the "twilight" zone where the distinction between the two is not obvious, an even better method is available. Then the dilution numbers can be dispensed with and the product tested directly against

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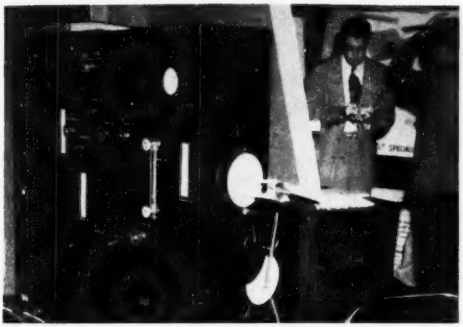
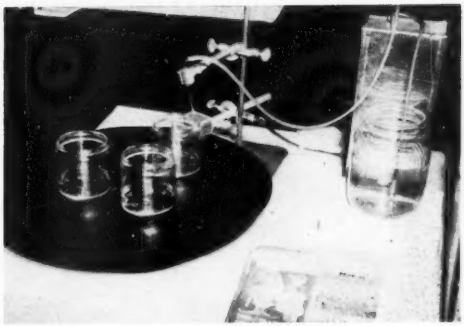


NEW COOKER seen by IFT'ers. This pilot unit, displayed by Food Machinery & Chemical Corp. permits canners to test their packs before actual start of commercial runs.



HOW small, measured amounts of spice oils are introduced into jars is demonstrated by individual-jar flavoring device exhibit by Magnus, Mabee & Reynard.

Latest Products and Devices

Lure Interest at IFT Annual Convention

Technologists gathered in New York City saw new and improved ingredients and enrichment materials, checking units, and a novel spice-oil filler

MAKING the rounds of the display of exhibitors, food technologists attending the 11th annual convention of the Institute of Food Technologists in New York City saw a wide array of new materials and advanced food-processing equipment. They also learned of latest application of special ingredients in food products.

Displayed at the booth of Chas. Pfizer & Co., Inc., was stabilized crystalline vitamin A acetate, which is now available in commercial quantities for the first time. The tiny vitamin crystals are completely enveloped in a matrix of food-grade gelatin and sugar to form highly stable, spherical shaped granules. The coating of plasticized gelatin is impervious to air and thereby excludes the destructive action of oxygen and prevents contact of the vitamin with other materials that might cause rapid destruction.

Range of Particle Sizes

In order to provide maximum flexibility for incorporation into food products, the stabilized vitamin is available in a range of particle sizes to meet almost any product formulation. In this unique form, vitamin A can now be added to many foods that must withstand drastic processing and storage conditions. Suggested is its incorporation in such products as milk powders, infant formulas, chocolate, cocoa and malt powders, special dietary supplements, and cereals.

Technologists also discovered Griffith Laboratories' new line of Royal Soluble Dry Seasonings—a combination of oleoresins and natural extractives from spices with essential oils. Of the 28 different soluble seasonings offered, principal ones are black pepper, sage, nutmeg, coriander, and mace.

These solubles were specially developed for manufacturers of sausage products, sauces, soups, stews, catchup, mayonnaise, and salad dressing. Since they are more uniform in flavor strength than natural spices, food industry users can now employ these solubles so that there is no longer any variation in the concentration of flavors in their products. Being tannin-free, meat packers can use the sage-soluble in sausages and thus prevent discoloration. Other advantages in employing these seasonings are the elimination of bacterial contamination and specks.

C. B. Gentry Co. featured three new products: (1) A barbecue mix containing 27 different spices (barbecue sauce is made by combining 1 lb. of the mix with ½ gal. of water, ½ gal. of tomato paste, and 8 oz. of vinegar); (2) a chili-frank mix, which when added to frankfurters, produces the new Chili-Frank; and (3) a ground red pepper derived from a new strain of peppers. The latter product is claimed to have better heat (bite) and color value than the ground red pepper formerly offered by the firm.

Florasynth Laboratories, Inc., came out with a new imitation raspberry flavor that it reports has more of a fruity odor and flavor, as contrasted with the former synthetic ionone aroma and taste. This firm also displayed a new line of imitation citrus oils—lemon, lime, and orange—that are termed more stable and are stated to cost about half as much as the natural oils now in short supply.

Cite Candy Applicaiton

Newer uses of Atlas Powder Co.'s monostearates (Span 60 and Tween 60) and its moisture-conditioning agent, Sorbitol, were reported. In the manufacture of candies, for example, Paul F. Beich Co., Bloomington, Ill., is supplying the armed forces with a coconut-cream bar in which the center candy contains about 15 percent Sorbitol and the coating about 1 percent of the monostearates.

Through adoption of improved bacteriological control facilities, Anheuser-Busch, Inc., now has available a dried food yeast said to be free of the type of organisms that withstand high re-

(*Turn to page* 166)

PRODUCT is packed in 1 and 3 lb. cans for retail trade, and in 50 lb. cans and 400 lb. drums for industrial users.

SUPERIOR ANIMAL SHORTENING

Turned Out by New 4-Stage Process

Advanced refining operation employs Dowtherm-heated, high vacuum unit in deodorizing of special blended fats. Newly efficient materials-handling technics and instrument control of time and temperature mark the method

IVAN C. MILLER
Assistant Editor, "Food Engineering"

Very promising market acceptance is currently being built for a new shortening—an all-animal product refined by advanced engineering technics that are providing the packer with larger profit margins.

Consisting of wet steam-rendered lard, edible beef fat, and hydrogenated lard, this new product is now being manufactured by an efficient four-stage process recently developed by E. Kahn Sons, well-known Cincinnati meat packer. Notable in the advanced processing are these benefits:

- **Improvement of product quality and extension of its shelf-life.**
- **Reduction of refining losses and enhanced man-hour productivity.**
- **Savings in time and expense of materials handling.**
- **Increased production per square foot of floor space and lowered floor-maintenance costs and repairs.**

Sequence of the four-stage process is:

1. Rendering hog fat into pure lard.
2. Hydrogenating a small portion of the lard.
3. Blending the shortening and then deodorizing it.
4. Finishing and packaging.

Stages 2, 3, and 4 in this processing are continuous. And in Stage 1, production has been speeded by mechanization and the adoption of assembly line technics. Thus, the cost of rendering the lard has been lowered.

Hog Trimming and Lard Rendering

Mechanization of processing starts with hog cutting and trimming and has stepped up the capacity to 660 carcasses per hour, an important increase over former methods.

Carcasses from chill-room storage are transported by overhead chain conveyor to the cutting floor. They discharge onto a stainless steel table-top conveyor that transports them to four dismembering stations. Different sections of the carcasses are removed at each station and transferred to one of four other table-top conveyors, extending at right angles from the first.

Cutters and trimmers flank the four conveyors, each workman performing the same cutting or trimming operation repetitively.

Before the plant was mechanized, fat trimmings for the lard rendering department were tossed into metal hoppers mounted on trucks. Large aisles were necessary to permit the trucks to maneuver. This reduced the space available on the floor for cutting and trimming.

Daily maintenance of the trucks was expedient. Necessary were periodic repairs and resurfacing of floors rutted by the truck wheels. And under the old system eight men spent their time laboriously pushing filled carts to rendering tanks and returning with empties.

Novel Materials Handling System

Now, all fat trimmings are dropped into chutes at the conveyor sides. Gravity carries them to a hopper fed pump that pushes the fat through 6 in. pipe to the rendering tanks.

Powered by a 25 hp. motor, the pump delivers 30,000 lb. of fat trimmings per hour through 200 ft. of pipe that turns at right angles twice enroute to the tanks.

Thus, the trucks have been dispensed with, saving the labor of the eight men who pushed them and, of course, ending truck maintenance and truck-rutted floors. Only manual operation necessary now is shifting chutes from the discharge end of the pipe to feed each of the tanks.

Time of rendering has been trimmed by the pump installation. Because the delivery of fat to each tank is continuous and uniform, heat can be applied as soon as the fill starts. That means that more fat can be rendered per tank per day.

Use of the pump is an ingenious adaptation to food processing of a machine built to solve a special problem of the construction industry. Originally designed to move concrete 1,000 ft. horizontally or against a 100 ft. head this Chain Belt Co. unit—the Cretepump—is seen bringing economical solution to costly materials handling problems in food processes other than lard rendering.

Another device borrowed from the builder's manual is the swing chute arrangement that permits filling six different tanks from one pipe outlet.

How Pump and Pipe Line Are Cleaned

The pump cylinder is cleaned continuously. Wash water, introduced behind the replaceable rubber piston end, cleans the cylinder back of the piston, without making contact with the fat. The cylinder in front of the piston is accessible for cleaning when the pipe line is disconnected.

At the end of a day's run, the section of pipe next to the pump is detached by loosening a toggle coupling. After a rubber tipped "go-devil" or wad of wet cloth sacking is inserted in the line, a pneumatic head is clamped on the pipe end. Air at 90 lb. pressure forces the wad through the pipe, cleaning the line of remaining fat. The pipe is then steam cleaned and finally lubricated with an oil-soaked cloth wad, air driven through the line.

The lard is wet-steam rendered in the conventional way, after which it is cooled and held in temporary storage for conversion to shortening. A portion of the lard is pumped to a separate building that houses the hydrogenating plant. Here, the rendered lard is stored at 160 deg. F. in four steam-coil heated tanks of 30,000 lb. capacity each.

How Lard Is Hydrogenated

From storage, lard is pumped to a deaerator where, for safety reasons, all moisture and entrained air are removed under a vacuum of 27 in.

Nickel catalyzing agent is mixed with and suspended in a small batch of lard. Preparation takes place in a small mechanically agitated vessel, from which the mixture is fed into the lard line between storage tank and deaerator. Correct proportioning is assured by a positive displacement pump.

Temperature of the fat is now boosted to 300 deg. F. in a heat exchanger and then the fat is delivered to the reactor, entering from the top. Here, at 150 lb. pressure, and in the presence of the catalyzer, unsaturated glycerides in the lard are saturated by hydrogen gas introduced at the bottom of the pressure vessel.

Hydrogenated fat, which leaves the reactor at 150 lb. pressure, passes continuously through plate and frame filters to remove the catalyzer. Two filters are used intermittently to obtain continuous operation.

Instruments Control Hydrogenation

Flow of lard to the reactor is measured by a rotometer and controlled by regulating valves. To prevent overheating of fat during hydrogenation, the temperature of the fat in the reactor is both instrument recorded and controlled. Internal pressure is also regulated by instrumentation as is the vacuum in the deaerator.

End-point of the hydrogenated fat may be either an ingredient for use in preparing shortening or a product to be further processed into hardened lard flakes. The fat that is to be incorporated in shortening is pumped to the deodorizing plant.

Flakes are made by hardening the hydrogenated fat on a rotating drum cooled by direct expansion of the refrigerant. As the hardened fat is mechanically scraped from the drum, it breaks into flakes, which are then automatically measured by batch scale and packaged, 100 lb. to the bag.

Hydrogenated fat is a stable product finding a ready market with packers who desire it for use in increasing the plasticity of lard.

How Shortening Is Deodorized

Three animal fats are blended in a 15,000-lb. mechanically agitated mixer. Blend composition is roughly 6½ to 7½ percent hydrogenated fat and 15 to 25 percent edible beef fat, with the balance rendered lard.

From the mixer, the blend is pumped through plate-and-frame filters to a deodorizer storage tank that holds 60,000 lb. Here, temperature is maintained at 160 deg. F.

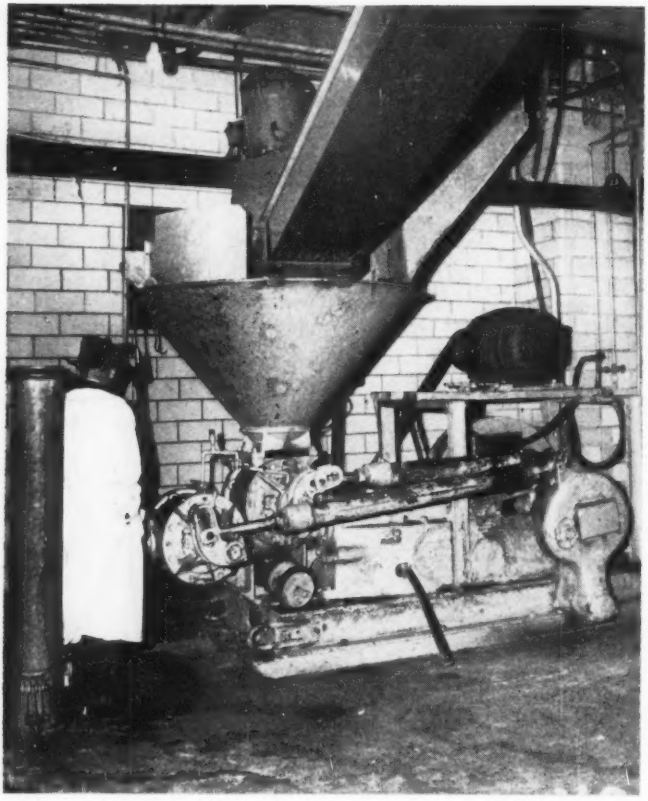
From this storage, blended fats are pumped to the deodorizer feed tank. Holding approximately 2,000 lb. of fat, this unit requires ½ hr. to fill and discharge.

It is float-valve controlled. As the tank approaches empty, the control stops the feed to the deodorizer and starts the pump supplying fat from the storage tank. When the feed tank is full the float control stops the pump and opens the valve in the line feeding the deod-

Production-Line Layout

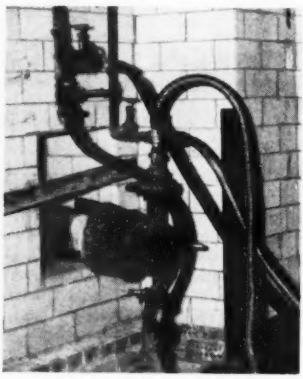
—of E. Kahn Sons Co.'s unique method for processing its all-animal shortening is shown in graphic detail in this month's special FE Foldout Picture-Flowsheet. There you will find each step diagrammed, with key points depicted by closeup photos. Just turn to pages 136-139.

How Product Is Rendered . . . Special Lab and Its Functions

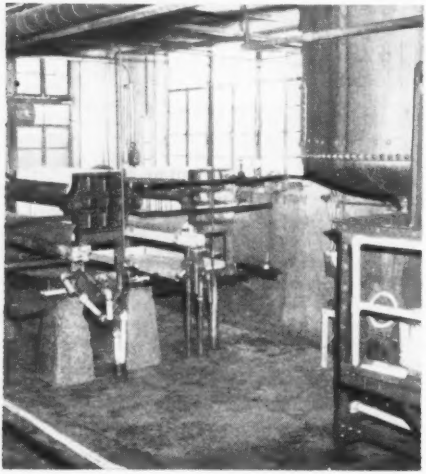


PUMP, adopted from construction industry, receives fat trimmings from floor above and delivers them approximately 200 ft. to rendering.

SWING CHUTE distributes fat from pipe line to six rendering tanks.



PNEUMATIC HEAD for air and steam is attached to pipe for cleaning.



FILTRATION of shortening before deodorizing is continuous with these two plate-and-frame units.

LABORATORY at meat packing plant solves customer baking problems, demonstrates uses of animal shortening.

orizer. Although feed tank operation is intermittent, the entire deodorizing operation is continuous.

How Continuous Deodorizer Functions

Fat remains in the deodorizer 2½ hr., during which time it is processed successively for 30 min. in each of five 2,000-lb. capacity trays (see Points 1-5 in accompanying drawing). At the end of a 30 min. interval, motor operated valve (Point 6) is opened to discharge the fat in tray (5) to the drop tank. When the tray is empty, Flex-O-Timer motor control (7) closes valve (6), after which valve (8) is opened and closed by its motor control. In a like manner, the contents of each tray is discharged in sequence to the tray below. Time necessary to empty each tray is 2-3 min.

Incoming fat from the feed tank is heated to 375 deg. F. by steam coils in Tray 1. At the same time, the fat in Tray 2 is heated from 375 to 475 deg. F. Dowtherm, heated in a separate gas fired unit, is circulated through coils in the tray to raise the fat to the required temperature.

Three Precautions

Elevating the temperature to 475 deg. F. without injury to the fat is possible because of the following precautions: 1. Trays and other deoderizer parts in contact with the fat at high temperatures are made of noncorrosive metal (pure nickel). 2. The system is at all times steam purged of air. 3. A vacuum of 6-8 mm. is maintained throughout the unit, including the drop tank, by steam condenser and air ejector system.

(*Turn to page* 204)

This Unit Makes the Difference

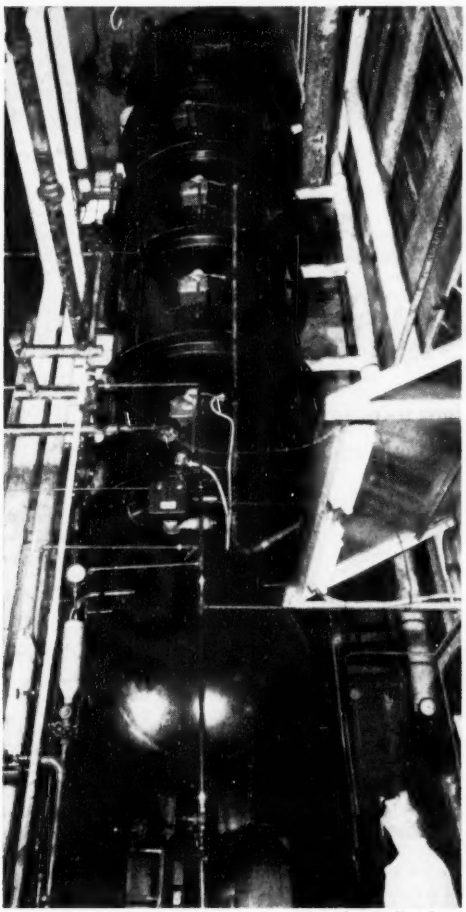
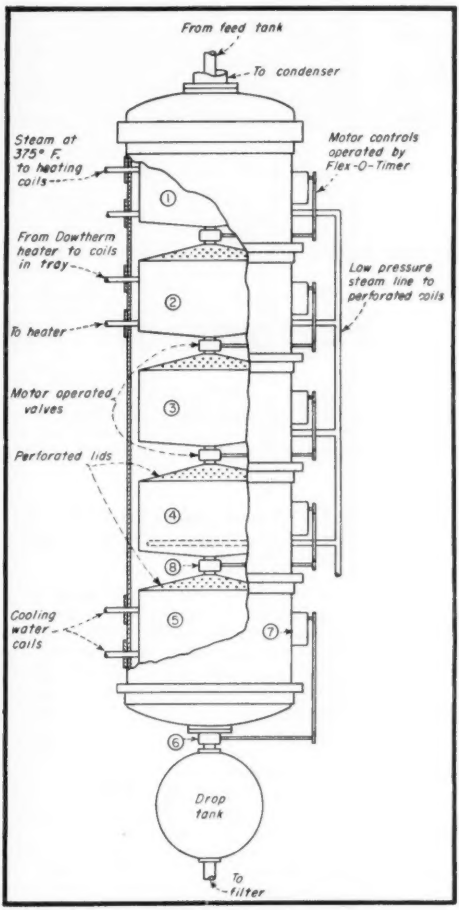
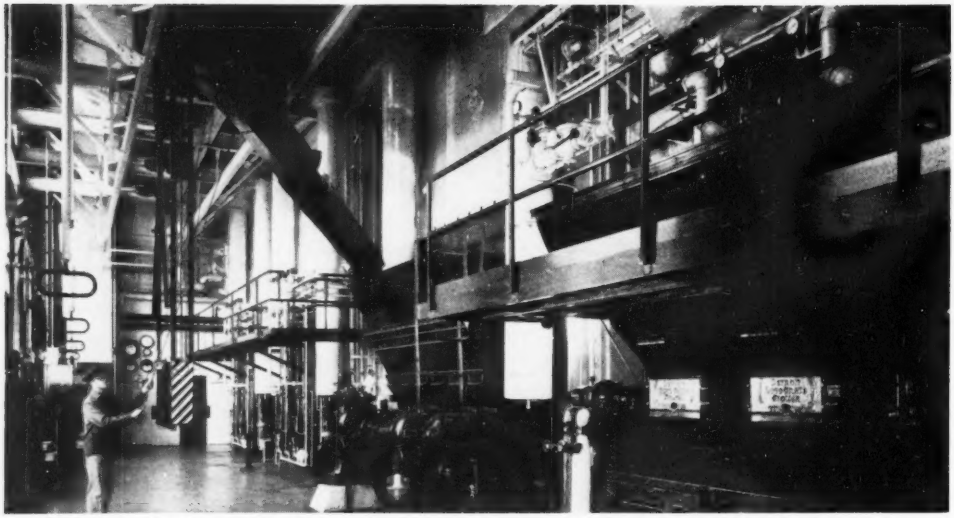


Photo by Girdler Corp.



FIVE-STAGE DEODORIZER purifies shortening by removing fatty acids and odor-producing, flavor-carrying volatiles. Note five time-cycle controls (front) that enabled conversion from intermittent to continuous operation. Right: Schematic of unit. Every 30 min., 2,000 lb. of shortening is delivered from feed tank to tray (1) where it is heated to 375 F. At end of 30 min., valve in bottom of tray opens, allowing product to flow into tray (2) for further heating to 475 F. with Dowtherm. In trays (3) and (4), fat is agitated with wet steam without further heating, then drops into tray (5), is water cooled, then finally emptied into drop tank. Entire process is under 6 to 8 mm. vacuum.



NEW PLANNING started here. In centrally located power house, these boilers provide all steam for processing and driving of turbo-generators which supply electric power. All but one of boilers now use natural gas as fuel.

Foresight in Brewery's Program Assured

Expansion Tuned to *Quality*

Established character of Hamm's beer "got priority" through management's teaming of engineering and control in multi-million-dollar improvement

WILLIAM H. LANG and CRAIG WOOLEY
Respectively, Vice-President & General Manager, and Assistant Plant Engineer (now on active duty with U. S. Navy), Theo. Hamm Brewing Co., St. Paul, Minn.

Management at the Theo. Hamm Brewing Co., St. Paul, quickly recognized that more than mere reactivation—more than conventional modernization and enlargement—was involved in the prob'em that faced the company at the time of Repeal.

Just picking up from where operations had left off 13 years before was not enough. A proper program must be comprehensive. It must not only take advantage of intervening engineering developments but also must march on abreast of advances into the following decades.

Throughout, executives insisted, the primary object must be to keep, in the company beer, the same character and quality that had been established and maintained since 1865. This meant a planned, careful balance between a definite brewing procedure and large-scale engineering efficiency.

Hamm's set its sights on that goal, and it fixed a step-by-step pattern of reaching it. Starting with the power supply, the company systematically planned an extensive program of modernization.

The recently completed $12,000,000 program—proof of practical pairing of quality control and engineering—included:

- **Malting all barley in a million-bushel automatically controlled plant.**
- **Culturing individual yeast strains in an air-conditioned, sterile process.**
- **Controlling fermentation positively in a tiled, Swiss-engineered cellar.**
- **Using carbon dioxide quantitatively through a new system of gas handling.**
- **Increasing storage capacity ratio for aging more smoothness into beer.**

In 1933, the brewery's facilities were along the orthodox lines of standard pre-prohibition design. All brewhouse equipment, including steam driven refrigeration compressors and a large power-supplying steam engine, was installed in 1893. Adjoining was a fermenting and ruh cellar—the same structure housing the racking room, brewmaster's office, and lab. This building, in turn, connected directly with the wash house, which also enclosed a cooper shop, pitch yard, and keg storage area.

East of the brewhouse was a five-story structure, originally used for malting but subsequently rebuilt with concrete slab floors to store sacked adjuncts. Further east of this building was a six-story arch brick and steel constructed cellar with wooden starters, fermenters and ruh tanks.

In the center of the quadrangle of buildings stood the boiler house. It was equipped with six 150 hp. HRT boilers and two 300 hp. Heine units, as well as a 350-ton cross-compound Corliss driven ammonia compressor.

All the above facilities were so placed, relative to one another, that

functional expansion was almost impossible. This fact, plus a dire need for more steam and refrigeration, caused management to decide on complete decentralization of plant components. Thus, each function would be isolated by enough ground to allow future expansion. At the geometrical center of the steam load of this planned building group would be the first construction—an entirely new power plant.

New Units Installed

Boiler room of the new power building was sized to accommodate four 25,000 lb. per hr. boilers, three of which were then installed. These provided steam at 300 lb., 600 deg. F., and were coal fired by underfeed stokers. They served two 1,250 Kva. extraction condensing turbo-generators.

Steam at 55 lb. is bled from the turbines for processing and heating. Balance of steam from these machines goes to surface condensers supplied with cooling water from ammonia condensers. The generators operate at 4,160v. and supply, by means of underground cables, five transformer banks located at load centers throughout the plant.

Refrigeration requirements were met by relocating the 350-ton, steam driven ammonia compressor and adding a 375-ton motor driven machine. A 600 hp. synchronous motor, driving this latter unit, provides sufficient correction to maintain the system power factor above 95 at all times.

A Rip Van Winkle Role

—was played, involuntarily, by American brewing during the 13 years of Prohibition. And then in '33, the brewers, like Rip, faced a remarkably changed industrial world.

New materials and machine technics had ushered in an era of unprecedented manufacturing efficiency. And evolution of distribution and merchandising had brought a whole new complex in the producer-consumer sphere.

Like many another brewery, the day of Repeal found Hamm with plant facilities that were decidedly undersized and badly run-down after the years of inactivity. Engineering progress had outmoded the plant.

But as told here, Hamm executives acted fast. They immediately launched a multi-million-dollar program that specifically considered the future as well as the present.

That program now pays off—in worker efficiency, morale, and safety; in maintaining the high standard of quality production; and in increased volume. And aided by Hamm's expert promotion, sales have steadily risen, with 1951 seen as a record-breaking year.

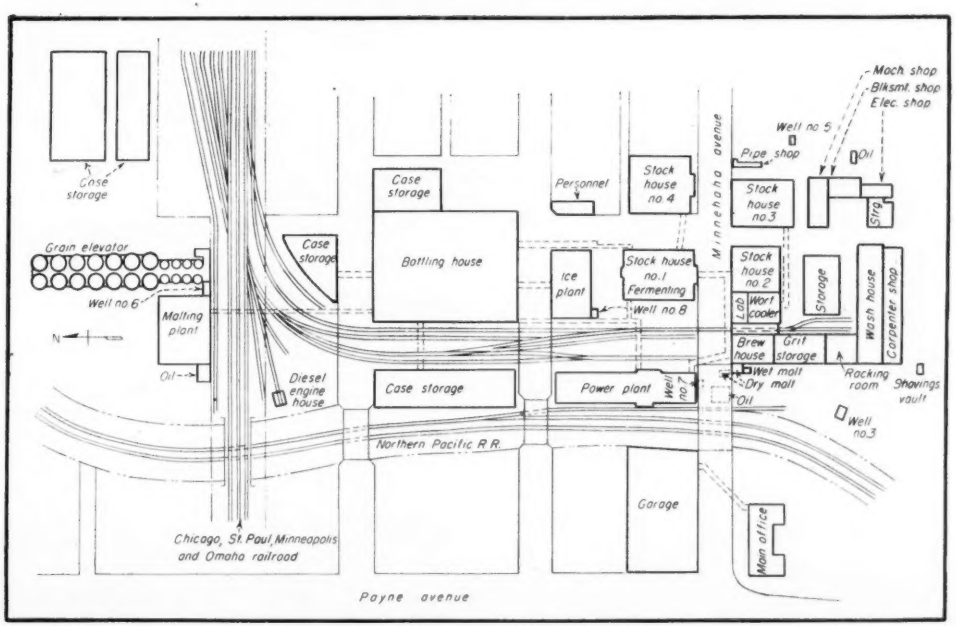
Brewhouse Revamped

Next step in this initial improvement program was to overhaul the brewhouse. The old ornamental towers accommodating the malt mill and receiving tanks were removed and a flat parapeted roof was built at sixth floor level. All walls were lined with glazed tile, and floors were surfaced with red quarry tile, with sloping tile gutter drainage. An open pipe well was built to carry all service lines needed. These tee off under the ceiling of each floor and avoid process room piping.

In the brewhouse a second cereal cooker was added and a mash mixer and two lauter tubs were set up in place of two mash tubs. Also, a Witteman hop strainer came in as two hop jacks went out. The malt mill was relocated in an adjacent building, with space available for a second unit and rice mill.

After the new power plant was built and the brewhouse revamped, the improvement program gathered acceleration and was continuously in progress

1951 Plant Layout—For Handy Reference as You Read



until the war. It included construction of a million-bushel Sa'adin malting plant, with a half-million bushel concrete grain elevator and work house adjacent. Also, it involved complete replacement of all equipment in the bottlinghouse as well as construction of two new case-handling warehouses nearby.

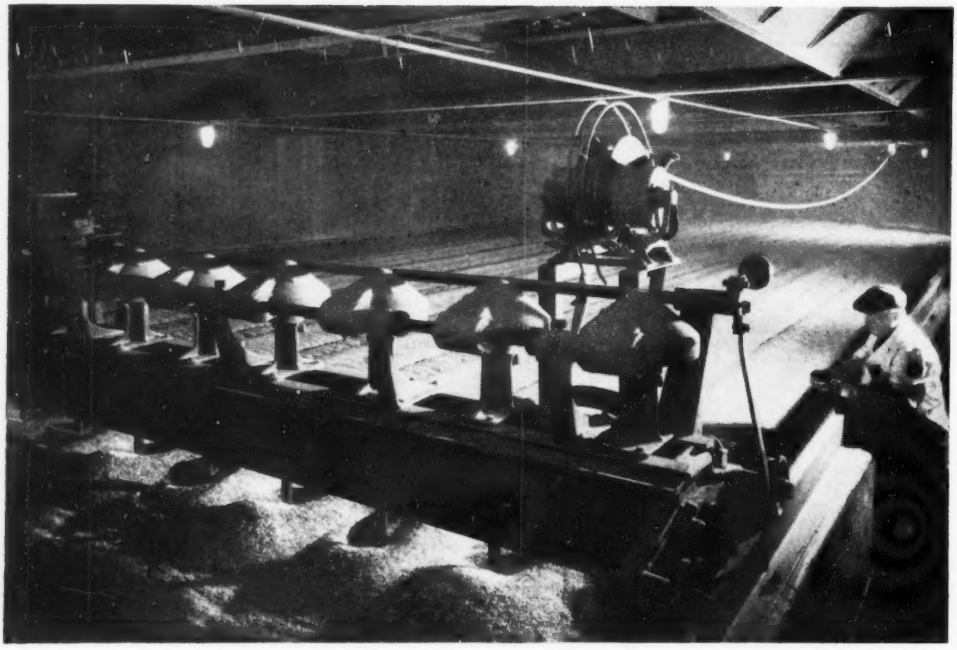
Next construction was a 30,000 sq. ft. garage building to repair and service the 50 company trucks. And in 1937 the last pre-war structure, a modern two-story office building with approximately 15,000 sq. ft. of floor area, was completed.

Postwar Expansion

With the advent of war, the plant had developed to an 800,000 bbl. annual capacity. By 1945 the demand far exceeded this output, and a decision was made to expand operations by 70

MALTING PLANT provides control of this major ingredient. Cyclones are part of air conveyor system for grain.

ROLLING AGITATOR, equipped with revolving tines, is used in drying malt to about four percent moisture content.



percent, or to 1,300,000 bbl. per year. Further, it was agreed that a thorough modernization of all original facilities and equipment was needed—as opposed to spot improvements made before the war.

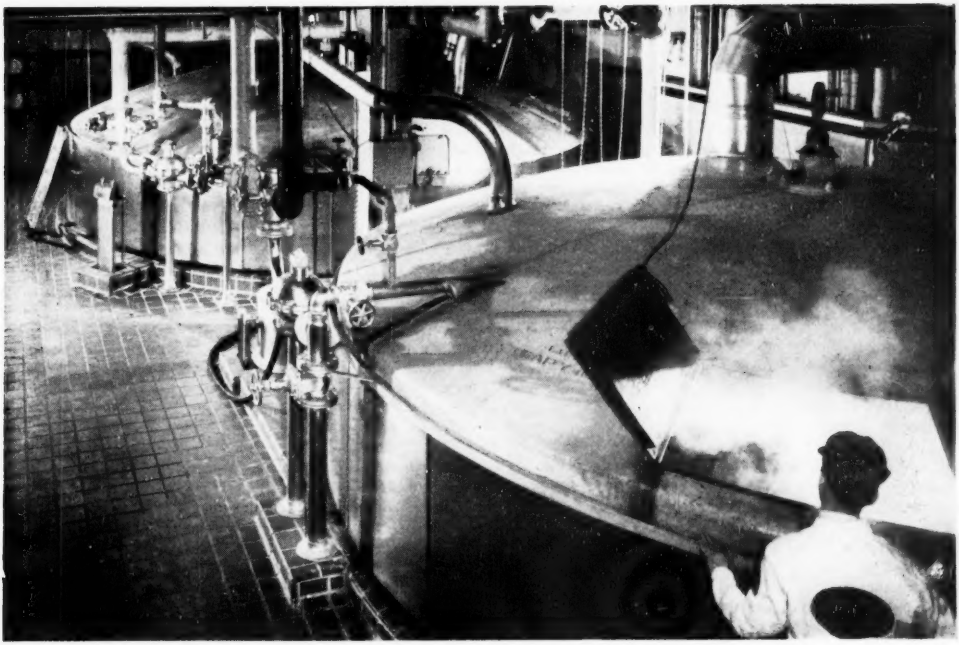
A program was formulated late in 1945 to carry out these objectives. First consideration was to bring existing facilities up to date. In this group fell the brew kettles, laboratory, adjunct handling equipment, fermenting cellars, and four of the seven lines in the bottling house.

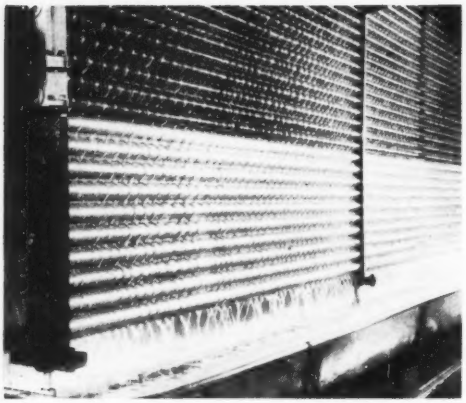
Fifty years of cleaning had worn the copper sides of two 450-bbl. brew-kettles dangerously thin. These old units were replaced with three new 500-bbl. units. Increased capacity here necessitated a third lauter tub and extra hot water supply tanks.

Another brewhouse replacement involved the vertical shaft mash mixer.

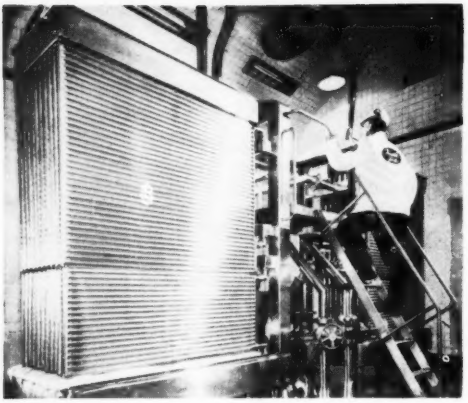
NEW COPPER BREW KETTLES (there are three) have 550 bbl. capacity each. Operator is seen adding hops to brew.

EXTRACTION of mash occurs in these Lauter tubs. Operator checks action of sparging arm through inspection door.





HOT WORT is cooled in this stainless steel unit enclosed in an individually air conditioned, lamp sterilized room.



AERATION of wort is through a pipeline injection of sterile air before liquid is cooled in these two plate units.

Installed back in 1938, this unit had worn its steam jacket bottom through. Two new horizontal shaft stainless clad units replaced it and increased capacity. All new brewhouse equipment, with the exception of the water tanks, was supplied by Schoek, Gusner & Co.

The control laboratory was small and in a poor location on the second floor of the racking building. Also, the brewmaster's office on the ground floor of the brewhouse had to be moved for the third kettle. This combination suggested remodeling the front section of the five-story adjunct storage building. It now includes the brewmaster's office, conference room, and production control offices on its first floor and a modern air-conditioned laboratory on the second.

The new lab is ideally situated from a functional standpoint, and it can be extended to the third floor of the building if necessary.

Adjunct Handling Improved

Brewers rice and corn grits were previously received in bags and pile-stored. These were carted when needed, to a bucket elevator hopper and opened for dumping. This elevator fed the brewhouse scale-hopper.

To eliminate this tedious routine, 24 vertical hopper-bottomed steel bulk storage tanks, each of 80,000 lb., were installed in the six-story arched brick building that formerly housed fermenting and ruh tanks. Bin tops are just below sixth floor level and are selectively fed by a system of Redler conveyors. Hoppered tank bottoms discharge into a series of gathering conveyors feeding a vertical Redler leading to both the brewhouse grits scale hopper and rice mill feed tank in the grinder room.

A Fuller Airveyor system was installed to move 25 tons per hr. of bulk adjuncts from cars. It feeds the distribution system above the tanks through a Richardson automatic weigher. The same system also transfers, at 1,200 bbl. per hour, elevator-stored malt to receiving tanks supplying the malt mills.

Malt handling has been considerably improved by the air conveying. The ingredient was previously transferred by rail from the present concrete elevator to wood storage crib elevators prior to use. It now is quickly carried through an 8-in., 1,200-ft. horizontal pipe run over the roofs of several intervening buildings.

For many years, hops had been stored off trackage and across a public street from the brewhouse. This required double handling by automotive truck—a costly operation.

To eliminate excessive hop handling, the third floor of Stock House No. 2 was stripped of obsolete wooden fermenters. Its old expansion-type ammonia refrigeration coils were also removed and replaced by flooded type unit blowers. A doorway was then broken out to provide access to the brewkettle floor as well as to a platform elevator at the railroad siding.

The new, ideally located storage area held 450,000 lb. of baled hops. To supplement this, the basement of the bulk adjunct storage building was stripped of its old ruh tanks and also made into hop storage.

Cooling and Culturing Improvements

Increased brewing capacity called for additional hot wort cooling. A new, vaulted-ceiling tile-lined room, air-conditioned and ultraviolet sterilized, was built next to the original cooler room. A 300 bbl. per hr. Jensen stainless steel cooler is the only processing unit in the sterile room.

Another similarly equipped tile-lined room was put up adjacent to house a new Pfaudler glass-line yeast culture system. This replaces a small capacity system formerly located in the old fermenting cellar. The new apparatus comprises a 33-bbl. fermenter, one 10-bbl. sterilizer, and two 10-bbl. propagators. It connects, by a stainless steel transfer line, to feeding tanks in the fermenting building.

New Fermentation Building

A two million dollar installation was planned to correct small capacity, and other poor features, of the old wood-tank fermenting cellar. Commission to build this new 72,000-bbl. fermenting cellar was given to the Bosari Tank Co. The resulting six-story structure is on the site of the old hop-storage building.

Each floor of the new facility has twelve 1,000 bbl. tanks. All 35x15x8-ft. in size. On the fifth floor, however, one tank space is divided into four 250 bbl. units used for test brews. And on the sixth floor—only level with open-tank construction—one tank space is divided into a 250 bbl. and two 125 bbl. vessels used as yeast propagators.

All mechanical equipment is located in the basement. Six 12,000 cu. ft. per min. York unit coolers, discharging through American Air Filter electrostatic air cleaners, compose the space-cooling system. Attemperator coils are fed with propylene glycol solution, coo'ed by two shell and tube ammonia coolers with duplicate circulating pumps.

Fermentation rate is regulated by Brown Indicating Pneumatic temperature controllers. Each tank is equipped with an instrument that positions an air operated valve in the coolant line in accordance with pre-set temperature.

Expansion of ruh cellar capacity was obtained by constructing a six-floor structural steel building. Each floor was equipped with 16 A. O. Smith glass-lined steel tanks, of 1,070 bbl. each, providing a total capacity of just over 100,000 bbl. Framework of this building is capable of carrying a total load of eight floors.

Working aisles of the new ruh cellar are of completely walled-off tiled constructions. All fittings, man-way chutes, and metal parts exposed in the aisles are of stainless steel or chrome-plated bronze. Cooling, on each level, is by two 88A York unit coolers, discharging through ducts running the length of tank areas.

Bottling House Changes

At the close of World War II, bottling facilities at the brewery consisted of four 160-bottles-per-min., 12-oz. lines; one 190 bottles-per-min., 12-oz. line; one 75 bottles-per-min., 32 oz. line; and one flat top line of 190 cans per min. capacity. Total house capacity was 175 bbl. per hr.

All bottling equipment had been installed during the 1930's. It consisted of Liquid Carbonic soakers, fillers, immersion-type pasteurizers, and duplex lablers, with Crown, Cork & Seal crowners and an American Can closing machine. A two-story building, 270x135 ft., housed this equipment, with government storage tanks in the basement. Of various sizes and types, the latter were inadequate in capacity and obsolete in design.

To modernize and enlarge this plant, a 60 ft. public street along the side of the old building was vacated. Here, a steel and concrete extension of three 20-ft.-wide bays was built. Each of these bays now houses a 240-per-min. 12-oz. bottling line. The new lines are equipped with Liquid Hydro 24 wide soakers, two Canco 40 spout fillers and crowners, spray-type pasteurizers (two Liquid Carbonic and one Barry-Wehmiller), Liquid triplex lablers, and Standard-Knapp packers, tapers, and compression sealers.

Column spacing in the old building only provided machine bays 15 ft. wide. These were too narrow for modern bottling lines and also prevented optimum sized storage tanks in the cellar. Accordingly they were removed and rebuilt into 20 ft. wide bays, as in the new addition.

With new, ample space, the old equipment could be replaced by lines duplicating the new portion of the building. In addition, a 300 per min. flat-top can line was installed adjacent to what had been line No. 7. This is equipped with a 60 spout Liquid filler, a No. 440 Canco closing machine, Barry-Wehmiller pasteurizer, Rockwell cartoner, and Standard-Knapp carton packer and compression sealer.

With all new construction and installations complete, the revamped bottling house, with ten lines now handles 350 bbl. per hr., as against 175 bbl. from the seven original lines.

An entirely new government cellar occupies the basement of the bottling plant. It contains 20 A. O. Smith tanks (400-bbl. capacity each) in an enclosed-walled construction. A bay off of the working aisle encloses four government beer meters, and an opposite bay contains a DeMarkus gas counter-pressure manifold.

New Gas Handling System

Since the turn of the century, Liquid Carbonic Co., or its predecessors, had purchased the brewery's excess fermentation gas for purification and charging into cylinders. Such work was done in a small structure near the brewhouse, which soon was unable to handle the volume of gas being generated. The brewery's own gas collection and storage system was also obsolete.

To remedy this, a completely new and improved system for handling fermentation gas was developed and installed. Gas from the fermenting tanks now passes through either of two centrifugal booster pumps to a purifier system. Here, it is first scrubbed in a water spray, then there follows further treatment by a potassium permanganate spray and a second water spray.

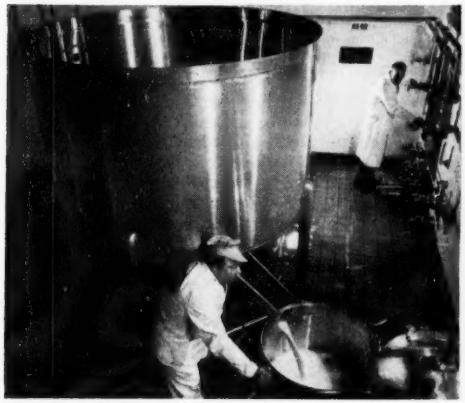
From the purifiers, gas passes to one or more of seven 26 cfm. DeMarkus units, where it is compressed to 225 lb. before being dehumidified and filtered through activated carbon canisters to remove last traces of brewery esters. A refrigerated area for 100,000 lb. provides adequate storage for liquid carbon dioxide until it is evaporated for brewery use or hauled away by insulated tank truck.

Since carbon dioxide is being sold as a byproduct, every effort is being made to reclaim gas from the bottle house, where it is used to push beer from government cellars to bottling lines. A 20 cfm. Taber compressor, a 26 cfm. DeMarkus compressor, and a DeMarkus manifold collecting system do this reclaiming.

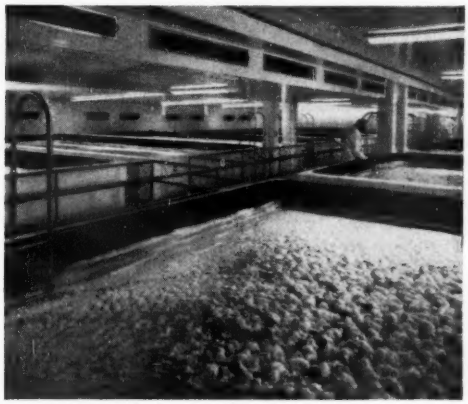
Gas collecting and reclaiming activities now furnish a byproduct averaging 3-lb. per bbl. of beer brewed. And the problem of scheduling brews in consideration of gas generating needs has been eliminated.

Power Efficiencies Adopted

Additional steam capacity needed by expanded plant facilities was met by installing a 60,000 lb. per hour, four-drum boiler built by the Bros Boiler Co. of Minneapolis. It is

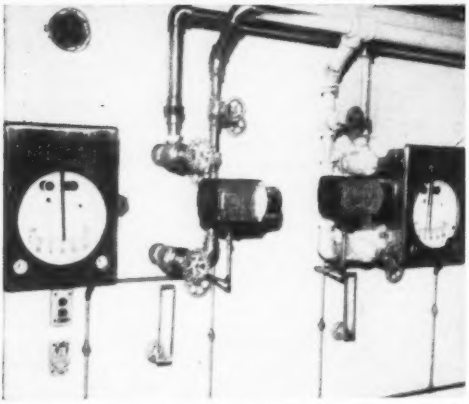


YEAST CULTURING takes place in this sterile, tile-lined, glass enclosed room. Operator is adding yeast to cool wort.



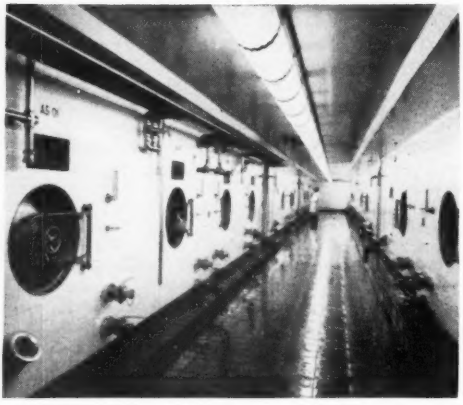
FERMENTATION starts in open tanks on top level of building. Conditioned air issues from vents along main corridor.

Instruments Control . . .



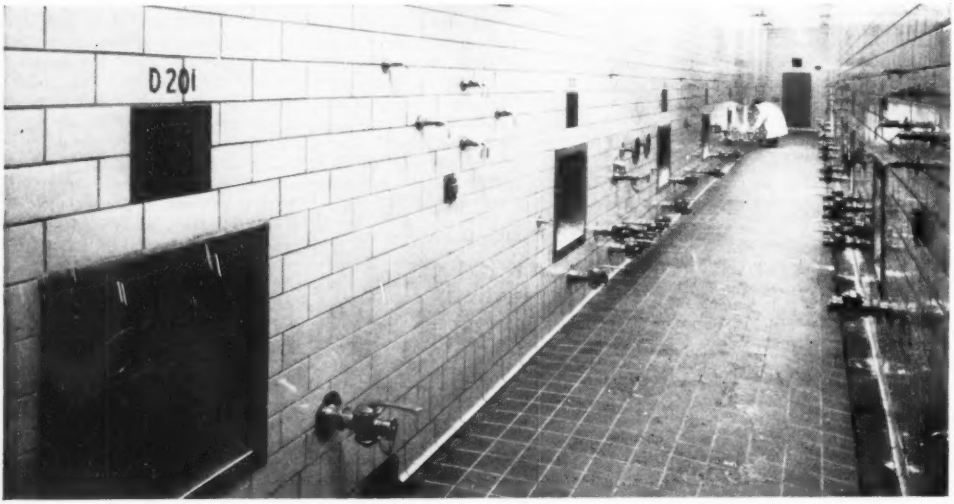
INSTRUMENTS AND VALVES control fermentation cycle by regulating flow of glycol to attemporators.

. . . Final Fermentation



IN THESE ebon-lined closed tanks (both sides) fermentation is completed. Carbon dioxide is drawn off, reinjected.

Then beer flows to these aging tanks



BEER is aged in glass-lined tanks behind these tile walls, in a six story building. Total capacity is 100,000 bbl.

equipped with a Detroit RotoGrate stoker as well as natural gas burners. The unit has an induced as well as a forced draft fan, an air preheater, and a convection type super-heater. It provides 600 deg. F. steam at 300 lb., and it can operate at 750 deg. F., 400 lb. if necessary.

Two of the original three boilers were rebuilt to accommodate gas burners, with oil burners on stand-by. The third was left as originally built—to burn coal, when needed. Use of natural gas, available since the summer of 1949, has provided a 40-percent fuel-cost saving.

Original power generating equipment placed in service in 1934 consisted of two 1,250 kva. General Electric units—one always on 100 percent stand-by. A consistently high power factor made it possible to carry sustained loads of 1,200 to 1,300 kw. without strain. However, expansion carried the load beyond this and it was necessary to take supplementary service from the power company in 1945.

As a remedy, the engine room was extended 70 ft. and a new 2,500 kw. G. E. generator was placed into service. The extended area also provided a location for both old generators and a fourth large unit, if needed. Centralizing the electric power generating equipment greatly simplified associated steam and condenser water piping.

The new 2,500 kw. turbo-generator operates, as does its companions, at 4,160v., 3 phase. It carries its own exciter in direct coupling and is cooled by a closed-circuit water-cooled air system. The turbine is at present nozzled to accept 600 deg. F., 285 lb. steam, but it can be simply adapted at 750 deg. F., 400 lb., should circumstances warrant raising plant pressure to that figure.

Steam is extracted at 55 lb. from the fifth stage (controlled by an extraction governor) for process use. Balance of the throttle input goes to a C. H. Wheeler surface condenser. Condenser cooling water is supplied from ammonia condensers at a temperature low enough to maintain turbine exhaust at about 1.5 to 2.0 in. vacuum.

Refrigeration Capacity Increased

Space vacated by moving the two old turbo-generators is now occupied by two new motor-driven ammonia compressors. Similar advantages in piping simplification accompanied this segregation of refrigeration equipment.

The two new 230-ton ammonia compressors are four cylinder, 11½ x 10 in. York machines, each driven by a 300 hp., 4,000v. synchronous motor. Original equipment comprised a 375-ton, 17 x 34 in. duplex Vilter unit driven by a cross-compound Corliss steam engine.

Previously, the two older machines were operated with "wet" suction. But replacement of most of the direct expansion cooling coils by flooded type blowers and introduction of a large separator in the suction line now provides a dry gas to the compressors. Their discharge temperature now runs around 190 deg. F., rather than the previous 90 deg. F.—providing a substantial increase in effectiveness as well as efficiency.

Plant water has been supplied by deep wells. Four of these are drilled to about 500 ft. and cased about 200 ft. below ground to cut off all surface water. Motor driven turbo-pumps deliver from 800 to 1,800 gal. per min. from these wells.

To meet increased beer output, a fifth well with a 2,000 gal. per min. pump has been drilled. The new water supply has a 16 in. casing with a 12 in. discharge. All pumps discharge at approximately 90 psi. into the plant water mains and are controlled from the power house engine room.

Pump motors, running up to 150 hp., are all 4,160v. and have control leads from oil circuit breakers terminating on panels in the engine room. Each well panel has, in addition to its control button and power lights, a recording and integrating flow meter, a set of inverse time limit overload relays, and a watt-hour meter and ammeter. Complete control of the water supply for the entire plant is thus in the hands of the shift engineer on duty.

Other Improvements

Draft beer business was handled principally in wood cooperage, although a start had been made in 1938 toward conversion to aluminum. By wartime, with its aluminum restrictions, about 20 percent of the inventory had been converted. It was decided to completely eliminate wooden cooperage when aluminum again became available.

Sufficient new aluminum packages were delivered in 1946 to accept this. The change permitted removal of four hoop drivers, two pitch-kettles, the cooper shop, and all keg soaking sprays—with substantial operational savings. Inventory is now composed of stainless steel and aluminum packages. Washing is done on three Schock-Gusmer-Schlangen, 15 station machines, with two stations equipped with caustic sprays.

To provide more adequate facilities for unloading cars of crowns, cartons and returned empty cases, a three-story and basement building was built adjacent to the bottle house. It has six doors and chutes equipped with conveyors that lead to a distribution system serving the entire building. A 7 x 7 ft. tunnel connects with the bottling operation.

The new case warehouse is steel framed with mill-type wood floors and is brick faced, backed up by 8 in. of load bearing tile. It is equipped with a platform elevator and automatic sprinklers. This construction provides a very satisfactory permanent building at low cost.

An old frame-cribbed grain elevator of 225,000 bu. capacity stood on the site of the new fermenting cellar. So when this was demolished, an addition affording another 500,000 bu. of capacity was built onto the original concrete elevator next to the malting plant. This provides a total malt storage capacity of 1,000,000 bu.

For many years, the personnel department had been housed in garage-building offices. This inadequate, poor location was replaced by remodeling a one-story and basement tavern building near the bottle house. The new location is quite close to the geometrical employment center of the plant. It also houses a first aid department.

Keeping Up to Date

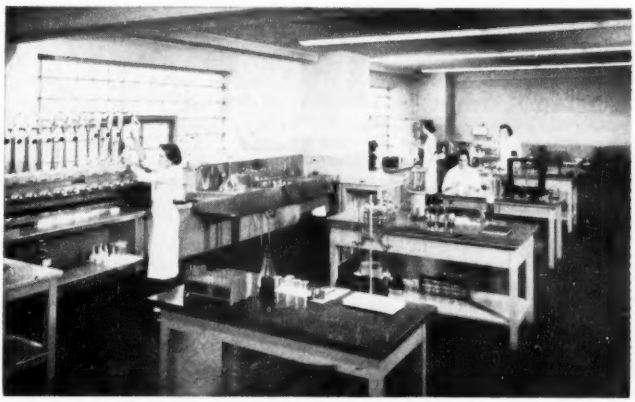
Face lifting some of the older buildings that were otherwise in good condition, lawn planting and yard paving, and a modern lighting system brought to a close the present expansion and improvement program.

But to make sure that disrepair does not slowly take its toll and that times do not pass this modern brewery by, a good-housekeeping committee has been established. This consists of engineers, brewmasters, personnel directors, and bottling superintendants. Function of the group is to promote cleanliness standards, while constantly checking for any signs of deterioration, unsafe equipment or practices, or places that lack eye-appeal.

Further, an engineering department has been established to be responsible for the design and coordination of future expansion and changes. Its job is to keep abreast of innovations in the brewing world, as well as to see that preventive maintenance is consistently performed.

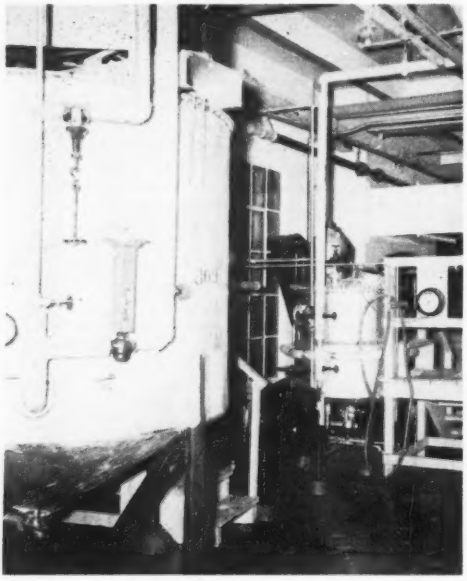
Representatives of three generations of the Hamm family—Theo., 1865 to 1903, William, Sr., 1903 to 1931, and William, Jr., 1931 to the present day—have guided, as presidents, the development of the brewing company from its modest beginning within a small grain mill to one of the most modern breweries in the world.

And since the company was founded, three generations of master brewers of the same family have passed their art from father to son—starting with Chris Figge, then William Figge, and now William C. Figge.

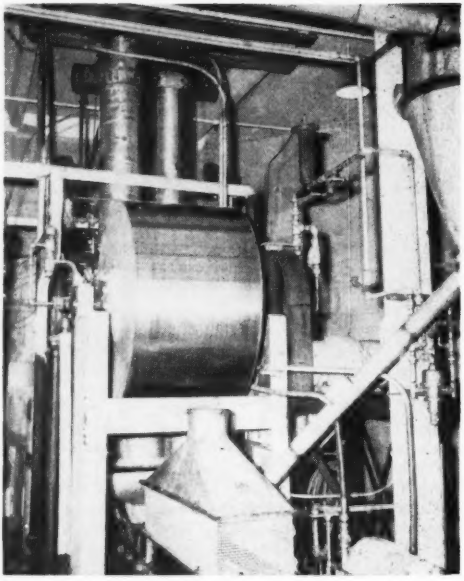


CONTROL laboratory includes equipment and instruments to test physical properties and quality of all ingredients as well as finished beer.

ABC of Its Manufacture ⟶



A CONFECTIONER' SUGAR is first melted in 1,200-gal. tank (left). Ten percent of melt is inverted in glass-lined steam heated tank (rear). Next . . .



B MELT SYRUP and inverted syrup go to steam cooker (top) then onto cooling drum (front). Cooked fondant drops into scroll-type creamer just beneath. Finally . . .

Now—A Readily Made Fondant For Bakers, Confectioners

Quality cake icings, fillings, also candy creams—incorporating fruit flavors if desired—are readily prepared from new precooked, dehydrated product that is simply and safely stored . . . manufacturing process described

RICHARD N. PRINCE
Technical Department, California & Hawaiian Sugar Refining Corp., Crockett, Calif.

Today, Mr. Average Baker can again employ—economically and conveniently—quality fondants, rather than needing to resort to powdered sugar.

And Mr. Average Confectioner, too, now has a ready source of inexpensively prepared fondant of assured uniformity.

These strides have been made through the development of Drivert—a basic all-sugar cooked and dehydrated fondant material, composed of myriads of microscopic crystals, that is manufactured by the California & Hawaiian Sugar Refining Corp., of Crockett, Calif. Priced only slightly higher than powdered sugar, the product is dry, free-flowing, and granular. ■ **It is converted in only a matter of minutes into a superior, smooth, creamy fondant—merely by mixing it with proper amounts of liquid.**

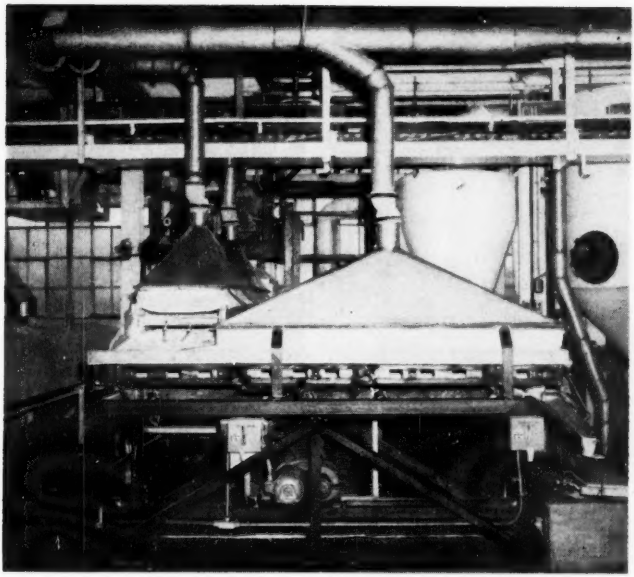
There is excellent flexibility in its use. Not only water, but also invert sugar, corn syrup, and fruit juices can be employed in its reconstitution. In addition, Drivert can be stored for long periods without deterioration.

Convenience of the new product offers important economies in labor and time. There is no need for the old drawn-out work of hand-making fondants nor for attendant costly skilled labor to attain uniformity.

Reconstitution and Use

Conversion of the dry granulated product into a creamy all-sugar fondant is very simple and rapid. The addition of 1¼ lb. of water (preferably hot) to 10 lb. of Drivert in a mechanical mixer, followed by 10-15 min. of mixing, produces an excellent fondant paste. This can be employed like any other fondant base. Furthermore, it can be used immediately, although, like most fondants, it is somewhat improved by ripening.

While the preparation of this base



CREAMED FONDANT, after being ribboned, shredded, and cut into particles, passes through a reverse air current in two vibrating dryers. Dry product is then screened and packed in protective paper bags.

is most simply accomplished by using water as the liquid ingredient, the versatility of the product is demonstrated as aforesaid, by the fact that other liquids may also be employed. The invert content may be controlled by supplying the moisture in the form of simple syrup or by substituting corn syrup for the liquid required.

Perhaps the greatest advantage is the fact that the moisture necessary for reconstitution can be added in the form of normal fruit juices. In this manner, the delicate flavors of natural fruit (commonly lost due to the high temperature required to cook fondants) can be added to, and retained in, a finished candy product.

Steps in Maker's Process

This basic all-sugar fondant is produced on a continuous volume production basis, under close laboratory control. The highly specialized operation is conducted by trained personnel having a thorough understanding of the physical and chemical properties of sucrose. The product is prepared from melted high purity confectioners' sugar, about 10 percent of which has been inverted.

The manufacturing process consists of four principal steps: (1) Preparation of melt syrup, (2) cooking of melt syrup, (3) creaming the cooked syrup, and (4) drying.

Confectioners' type sugar is dissolved in a ratio of 3 parts sugar to 1 part of water (Photo A). Because of the high sugar content of this syrup, the temperature is maintained at about 160 deg. F. After complete solution of the sugar is obtained, 10 percent of it by volume is pumped to the inverting tank. Hydrochloric acid is used as the inverting agent.

After inversion has been completed, the acid is completely neutralized with sodium carbonate monohydrate, which leaves only a trace of salt in the invert sugar. This inverted syrup is returned to the original melt tank and thoroughly mixed with the remaining sugar syrup therein. And after thoroughly mixing, the syrup is then pumped to the cooker-storage tank.

Syrup from the storage tank is delivered through two Baker-Perkins cookers by means of positive displacement pumps (Photo B). A variable speed drive on each pump controls the rate of flow through each cooker. Steam at 150 psi. is supplied to the cookers, where the syrup is concentrated by evaporation.

Cooker temperatures are varied in order to control the moisture content in the final product. The hot liquor from the cookers feeds onto a rotating drum through which tempered water passes. Temperature of the drum is usually maintained at about 135 deg. F., but it may be varied to control the moisture in the finished Drivert.

The cooked liquor drops from the cooling drum into a creamer. This is essentially a broken-flight scroll, with rotating fingers that thoroughly cream the very highly saturated sugar solution that drops from the drum.

(*Turn to page* 181)

The Reasons Behind the Development

Fondants have long been credited for their numerous advantages in imparting quality to baked goods and confections.

Moreover, the all-sucrose form of the product is now seen offering special possibilities for the improvement of a variety of other foods.

In recent years, however, the making of fondant by the baker may be said to have become a "lost art." In preparing bakery icings, there has been a turn to powdered sugar as a substitute for the fondant. Result is a coarser product that is not as high in luster and that has a tendency to dry out faster.

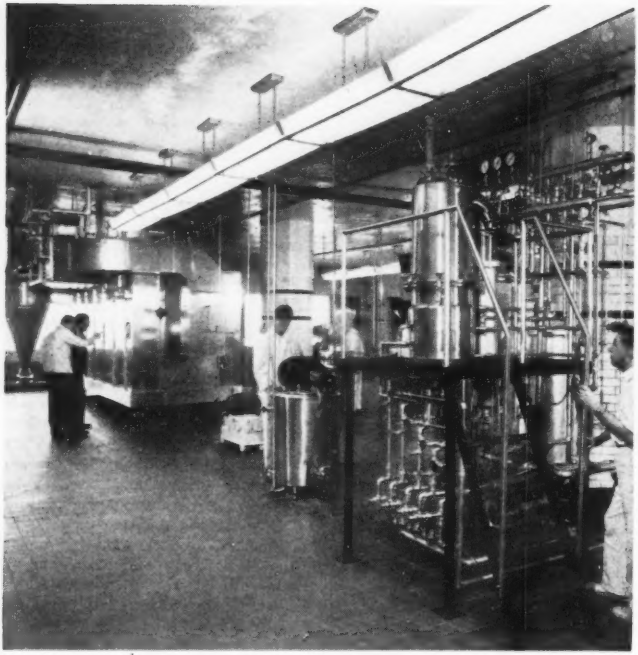
Probably the major reason that hand-making of fondants has declined is the tedious time-consuming operation required. And because of today's high labor costs, the plant-making of fondant has become overly expensive for the average baker. It takes considerable technical knowledge and skill to control the size of the extremely fine sucrose crystals required in a fondant of a uniformly high quality.

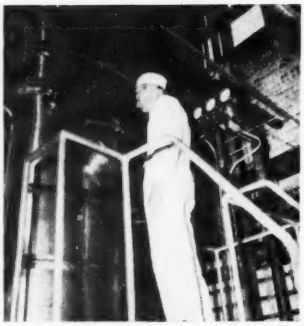
While the bakers have been able to substitute powdered sugar for their fondants (questionable though that may be), the confectioners have continued to face the requirement of a fondant that is of high uniformity and reasonable in cost of preparation.

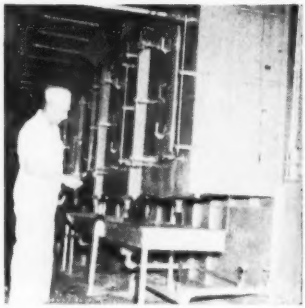
In contrast, the larger concerns find feasibility in setting up the specialized, continuous fondant-making equipment, together with supervisory laboratory controls — installations aimed to satisfy the higher-volume demands. As a result, they do not have a significant cost problem in the production of this ingredient.

However, in the average shop, problems of time, labor, skill and control still remain.

Hence, the development of the product described here—a uniform-quality dehydrated fondant material which the bakers and the smaller confectioners can employ quickly and conveniently, and without need for special equipment—*The Author*







BETWEEN pilot plant (left) and Beloit commercial operation (right) constant liaison is maintained to assure proper "meshing" of all changes as improvements are made in the product. Large photo shows lab size vacuum pan in foreground and pilot spray dryer in rear. Upper right: Large (15,000 lb./hr.) single-effect evaporator used to condense non-fat milk. Lower right: Spray dryer that handles 1,200 lb./hr. It has automatic screw-type unloader.

Piloting a New Product?

If So, Don't Spare Teamwork, Flexibility, or Vigilance

For success with a food debut takes far more than steering. It demands an accent on all the angles by plant man, researcher and engineer—as revealed here by the crack team that handles Beatrice's powdered shortening

A. J. ALTON, PETER NOZNICK and G. C. NORTH
Respectively, Beloit Production Manager, Chief Chemist, and Director of Research, Beatrice Foods Co., Chicago

Our commercial powdered shortening operation in Beloit, Wis., faces the daily enigma of meeting an ever-growing consumer demand with an everchanging product and process.

For powdered shortening, while already enjoying an established market, is a comparative newcomer to the ingredients field. So our research and development group in Chicago—where this product was first conceived—is still coming up with new and better versions to run commercially.

Further, in the plant operation, we are always attempting, in parallel fashion, to improve process technics. Not only are we actively on the trail of a "perfect" product, but we are also concerned with bettering quality tolerances in our current line of powdered shortenings while at the same time reducing manufacturing costs.

The result of all this is a plant operation which requires all personnel from management to clean-up workers to be on their toes at all times. For our process must be flexible enough to commercially emulate results obtained in small-scale laboratory pilot equipment. And the same standards of quality and engineering efficiency must apply in new-product runs as exist with standard and oft-run formulas.

Here, in general chronology, is how a new powdered-shortening product is brought to commercial saleability:

1. Request received for a product having certain characteristics.

2. Development of this "custom-made" product in Chicago Research Lab.

3. Submitting sample of new prod-

uct (made in experimental spray dryer in lab) to prospective customer.

4. If product meets customer's approval, a small commercial run of approximately 1,000 lb. is made in plant's 500 lb./hr. dryer.

5. If small commercial run is satisfactory from both plant operation and customer usage, runs of 10,000 to 12,000 lb. follow, employing large dryer.

Despite this ever-changing aspect of our operation, it is possible to trace here what might be considered a "basic" powdered-shortening process line. For, while ingredients and heat requirements may change, two fundamental technics underlie the process:

A. *A procedure of homogenization* that disperses vegetable fat into small globules surrounded by a liquid matrix containing emulsifier and non-fat milk solids.

B. *A spray drying procedure* that causes the non-fat milk solids to form a dry "hull" around each emulsifier-coated fat globule.

It might be said that the "character" of the product is formed during these two unit operations. It is easy to see why we give them our best in control and supervision.

Let's start with the prime ingredients of a typical powdered-shortening formula and follow them into the finished product:

Condensed milk, with butter fat removed, is a basic constituent. Our milk comes from surrounding dairy farms and is delivered into large-capacity storage tanks. These supply milk to our bottling department and to our various milk product lines, as well as to our powdered-shortening operation.

Whole milk from our common supply, is then run through a separator to remove the butterfat. Condensing follows in a 15,000 lb./hr. Harris single-effect unit. This vacuum pan operates under about 26 in. of vacuum, with product temperature running around 126 deg. F. Non-fat milk enters the evaporating station with 8 to 9 percent solids and is condensed to 35 percent solids.

Output from the evaporator is run into two 1,500-gal. stainless-steel storage tanks. A third tank stores the non-fat, non-condensed milk that is also used in the process. These tanks deliver both kinds of milk through stainless piping to a pair of 600-gal. jacketed mixing and pasteurizing vats on the floor above. To start making up a powdered shortening batch, a pump located down by the storage tanks is actuated by a vat-located pushbutton. This pump is allowed to run until the vat is filled to a predetermined level.

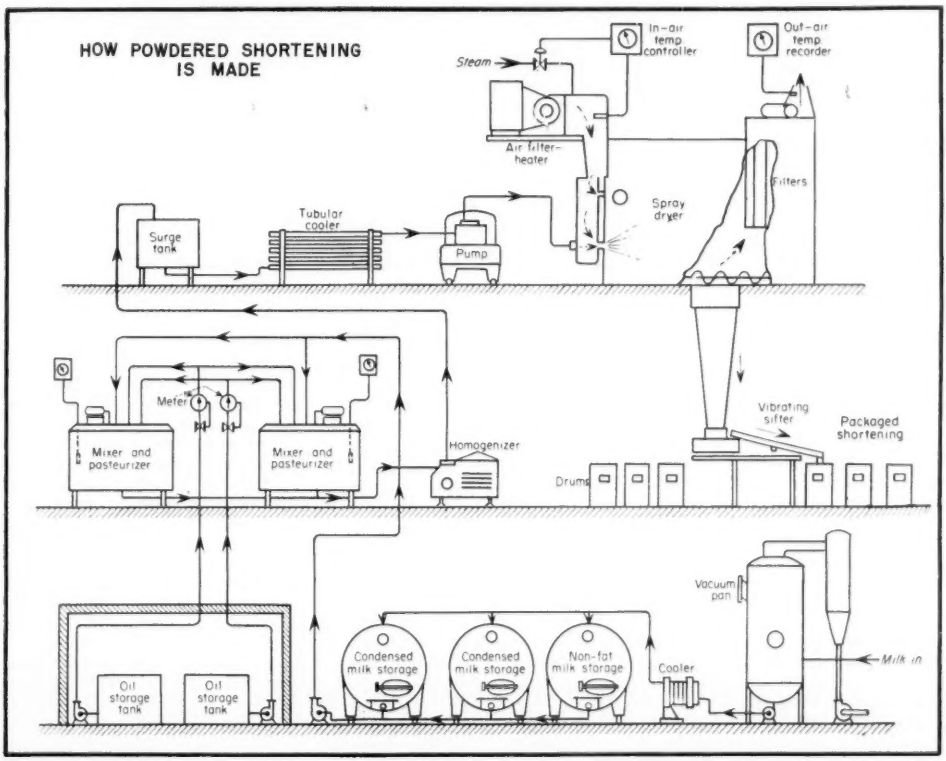
Next constitutents to be added for mixing are the vegetable oils. Most formulas call for either cottonseed or soy oil.

Automatic Oil Handling

Since vegetable oils are difficult to handle at normal room temperatures, we have found it advisable to tank-store these ingredients in an isolated, controlled-temperature room. They are handled by pump and pipe to our process.

When our processing schedule is heavy, we have as many as four or five 20,000 to 30,000 lb. capacity vegetable oil tank trucks delivering to us in a week. Our own pumps unload these carriers and send the two types of oil to 40,000 lb. tanks located in an insulated room on the ground floor.

Our oil storage room is maintained at about 110 deg. F. by a thermostatically-controlled steam-heat type system. We have found that temperatures below this allow deposition in pumps and pipes, as well as on tank walls



Vegetable oil pumps in the storage room are automatically controlled by Bowser indicating flow meters on the mixing floor. The operator merely sets the required oil volume on the meter and opens its oil feed valve. A switch actuates the associated pump to deliver the quantity called for by the meter. The feed valve then automatically closes and stops the pump.

Sugar is another constituent of our shortening. However, although we have a liquid-sugar handling system similar to our oil set-up, we have not yet found it advisable to use it in our new powdered-shortening process. This is due to the effect inverts (usually found in liquid sugar) have on our product. We undoubtedly will go over to our more convenient liquid-sugar handling system when this problem has been solved.

An emulsifier is another basic ingredient going into our mixing vat. And lately we have started to use egg products in some of our formulas. These give more satisfactory results in cake mixes than blended powdered shortening and dried eggs.

Once the formula is made up, a motor-driven propeller agitator is started in the batch and thorough mixing follows. The product is then pasteurized at 160 to 180 deg. F. Time and temperature of pasteurization varies with the properties desired in the end-product and the type of baked goods it will go into.

Key Homogenization Operation

Use of two mixing and pasteurizing vats sends a semi-continuous product flow to the next unit operation. This is homogenization—to form the preliminary character of the product. A single homogenizer handles 800 gal. /hr. at an approximate pressure of 2,500 lb. This action breaks the vegetable fat into small globules, the size of which are determined by the orifice opening and pressure.

From the homogenizer, the product —now containing a total solids content of from 30 to 40 percent—is fed into a stainless steel surge tank on the drying floor above. Then after preheating in a continuous tubular heat exchanger, the shortening is ready for spray-drying.

A Gaulin high pressure pump applies the necessary 2,500 to 3,000 lb. pressure to force the product through the nozzles of a Rogers 20 spray 1,200 lb./hr. dryer. Here, moisture content is reduced to less than 1 percent, with a milk solids non-fat "hull" forming around each fat globule. An automatic screw-type unloading unit continuously removes this powder from the dryer.

Before following our product to the sifting and packaging operation, it would be well to consider some of the engineering details that influence the drying procedure. For this operation forms the final character of the product and critically affects its keeping quality and appearance. Also, inefficient drying can send costs soaring.

We have tried to keep our drying procedure at optimum efficiency by controlling all variables. Most important of the factors are: Fixed solids content in incoming product; unvarying pressure to nozzles; exact nozzle opening sizing; controlled incoming air temperature, and non-fluctuating outgoing air temperature.

Stability of solids content in our incoming product depends, of course, on the caution exercised in preceding operations. The major factor influencing solids content is the milk condensing operation, since ingredients other than milk are exactly measured or metered into the mixing vat. In view of this, we run constant hydrometer readings on the discharge of the evaporator and also Mojonnier tests on our stored non-fat condensed milk. We try to limit variations in solids content to $\pm$ 1 percent.

Pressure to the nozzles is a factor that is easily controlled, but often overlooked. To circumvent error here, we maintain a check on the condition of suction, discharge, and by-pass valves on the Gaulin high-pressure pump. For these parts must be in perfect condition to prevent pressure fluctuations. Actually, however, replacement of stainless steel pump parts has rarely been found necessary when the units are properly maintained.

Greatest attention is paid to the spray nozzles. We have found Spraying Systems' core-type nozzles (with removable core and orifice inserts) to be very effective. Frequent inspection and renewal of nozzle components is desirable, for dried-particle size depends directly on toleranees here.

We have gone to great lengths to determine proper orifice size and operating characteristics of these spray nozzles. Occasionally, we shut down the dryer's continuous product-removal system and collect samples at different nozzle locations to check uniformity. The best nozzle opening for our operation seems to be .0292 in.—an unusually small size when one considers the amount of product it passes.

Air Temperature Controlled

An excellent boost in the efficiency of our spray dryer has been obtained by installing an automatic control system to maintain incoming air temperature. Employed is a Fisher "Wizard" indicating temperature controller. This unit has its bulb located in the incoming air duct, just beyond the steam heating coils. The instrument throttles a diaphragm valve in the steam supply to the heating coils in accordance with the pre-set temperature.

However, it is to be noted that the temperature setting of the incoming air is very dependent on the temperature of air exhausting from the dryer. In other words, the correct air drying temperature relies on an efficient heat-balance between incoming and outgoing air. To establish this balance, we have installed recorders that continuously measure these two temperatures. Resulting is an incoming-air temperature that usually ranges between 300 to 320 deg. F. and an outgoing air temperature of 175 to 185 deg. F.

It must be emphasized that all figures given here are constantly being adjusted in our operation. They are subject to revision every time we evaluate the final product—its appearance, moisture content, and other properties—in our plant control laboratory. Further, the final check—baking properties of the product—is made in our Chicago pilot baking plant, and this can also result in major adjustments in our process.

Filter-Bags Emptied Automatically

Another interesting addition of control equipment has improved the efficiency of our dryer. This has been the installation of two Taylor "Flex-O-Timers" for periodically initiating the automatic shaking of filter bags. These controllers, operating on the five sections of the dryer, automatically close the exhaust damper from a section so that no air is traveling through its particular filter as it is shaken down. After a suitable interval, when all powder in the filter has dropped to the floor of the dryer, vibration of this unit stops and the damper automatically opens. In this manner, each column of filter bags is cleaned once every 30 min.

After spray drying, the powdered shortening falls to the floor of the Rogers unit and is conveyed by a reciprocating conveyor to one side of the drying chamber. Here, a screw conveyor delivers it to a chute to the floor below, where it undergoes a cooling process prior to sifting.

A J. H. Day "Ro-Ball" gyrating unit does the sifting, separating undesirable from acceptable particle sizes. The sifter feeds into paperboard drums having moisture-vapor proof asphalt-barrier linings. Drum sizes vary from 47-gal. capacity—capable of holding 150 lb. of product —down to 41-gal. size.

A very important element in the success of our commercial powdered-shortening operation is the close liaison maintained between our central

(*Turn to page* 155)

A SPECIAL FOOD ENGINEERING REPORT

LIGHTING the FOOD PLANT

Properly illuminate your plant and you'll up output, quality and sanitation. Moreover, worker's tasks will be made easier and safer, thus improving employee relations . . . You can accomplish these objectives by carefully planning the lighting system and selecting the right equipment

WM. H. KAHLER
Lighting Engineer, Westinghouse Electric Corp., Cleveland

Good lighting is of major importance to the food processor—for without it, working conditions unquestionably suffer, resulting in lower production and poorer quality goods. Cleanliness is symbolic of the American food industry, and its indispensable sponsor is a light, cheerful environment.

How is this environment provided? It is true that illumination know-how has kept up with development of new light sources and new lighting equipment. But how do latest lighting principles apply specifically to food processing plants? And what is the application of these principles in terms of modern lighting technics?

The Illuminating Engineering Society has made detailed studies of lighting conditions and requirements in several branches of the food industry. In the report, "Lighting for Flour Mills",[1] inadequate conditions are summarized in the first paragraph: "In flour mill design little regard has been given to adequate illumination. In the past the practice has been to rely on natural daylight entering through small windows, and drop cords with bare filament lamps. The resultant illumination, of from less than 1 ft.-c. to as much as 5 ft.-c. in some inspection areas adjacent to the equipment, is entirely inadequate for the visual task performed during the 24 hr. day that most mills operate."

A similar comment is found in the report, "Lighting for Canneries",[2] which states "Two general conclusions resulted from the preliminary surveys conducted by the committee on lighting in the canning industry: (1) there was usually a need for improving the general lighting of the working

Seven Steps To a Good Lighting System

By following the guide given below, your plant engineer will be able to obtain a system of illumination that will be adequate, economical, and easy to service.

1. Have a lighting plan prepared by a qualified engineer who is familiar with modern and accepted industrial lighting practice.

2. Select lighting equipment that is well constructed by a reputable manufacturer. Industrial luminaires bearing the RLM (Reflector Lamp Manufacturers) label give assurance of quality and top performance according to RLM Standards. The Underwriters' label on equipment is assurance of electrical and mechanical safety.

3. Mount luminaires at heights and locations that permit access for maintenance. General lighting mounted 12 to 14 ft. above the floor is not too difficult to service. Mounting over 14 ft. may be required and will give satisfactory lighting, but maintenance may be more difficult.

4. Install adequate electrical feeders and circuits that will allow for future additional loads as well as present load.

5. Along with the lighting program, finish walls, ceilings and equipment with light-color paint. In general, ceilings should be white, walls a light color (50 to 60 percent reflectance), and equipment a medium light color (about 30 percent reflectance).

6. Consider cost from the standpoint of overall operating economy. Often a slightly higher first cost will result in operating economies and less maintenance.

7. Plan a regular maintenance program for frequent cleaning of luminaires and prompt renewal of lamp outages.

areas in canneries, and (2) canning operations necessitate a considerable amount and variety of supplementary lighting to illuminate properly such important seeing tasks as the sorting, grading, preparing, and canning of fruits, vegetables and other products."

Lighting vs. Employee-Management Relations

Many workers think of management in terms of the paycheck, but working conditions and environment also rate high in influencing attitude and willingness to do a good job. Adequate illumination is one plant facility that can be extremely beneficial to both management and the workers.

In a properly-lighted environment the process of seeing requires little expenditure of energy. Illumination is related to the speed of seeing and eye fatigue, and the energy expended in seeing is drawn from the general body reserve. Easier seeing conserves the worker's physical energy and helps him maintain a higher rate of efficieney throughout the work day.

The absence of dark corners and deep shadows, with lighting well distributed, will eliminate natural "dirt collectors". Good housekeeping is easier and faster when the complete plant is well lighted.

One cannery that modernized its lighting during the last war found by experience that imperfections in foods were detected more accurately and more quickly. Proper lighting is a "must" for inspection operations on both raw and finished products.

Night work is essential in most food processing plants, and 24-hr. operation is often required in handling seasonal products. With a complete and well-planned lighting system, the lack of daylight is no longer a hindrance to production efficiency and quality, nor is it necessary to locate critical seeing operations near the windows for best lighting. The plant can be arranged for best operating efficiency, with lighting tailored to the layout of operations.

Better lighting is not simply a bigger lamp bulb hanging from the ceiling. It is adequate light of better quality, directed where it is needed with better diffusion, less glare, and with less contrast between the brightness of the seeing task and the comparative darkness of the surrounding area.

Requirements for Good Seeing

The modern lighting engineer examines and classifies each seeing task; he notes whether it is one requiring only general illumination for handling or storage areas, or whether a high degree of visual acuity (the ability to distinguish fine detail) is needed to detect blemishes or to separate objects of close similar shapes or color.

He considers the need for careful seeing and accuracy to increase production and reduce cost. He looks for ways of making lighting more comfortable to reduce fatigue and eye strain. He recognizes the fact that higher levels of illumination will help to compensate for the failing vision that is commonly experienced by older workers.

How Much Light?

The amount of light, or "footcandles", required for a particular installation depends primarily upon the type of work being done. The size of detail and the necessity for accuracy, as well as the color and reflection factor of the seeing task, must be considered in determining the amount of light for a particular production operation. The amount of light should be increased as the severity of the seeing task increases. The theoretically correct amount of illumination must often be balanced against economic and mechanical limitation.

To establish a proper and practical illumination level for a certain seeing operation requires a careful analysis of the visual and engineering aspects of the problem. This has been the task of numerous technical committees of the Illuminating Engineering Society. The results of the Society's researches of seeing operations are here summarized in Table I, which lists the current recommended illumination levels for many seeing tasks in the food industry.

Distribution and Direction of Light

The basic or general lighting system in a food plant should be designed for uniform distribution over the entire work area. A basic lighting system designed in this manner will permit rearrangement of production equipment without changing the lighting system.

Many food processing operations require supplementary illumination (in addition to the general lighting system) due to the nature of the seeing task or its location in relation to the size and shape of processing machinery. The location of this supplementary lighting equipment is generally very important —if it is to provide the proper direction of light to prevent harsh shadows and to create the desired visibility of the seeing task.

Glare is really a seeing obstacle. It can be defined as too much brightness in the field of vision. Glare can be directed from an unshielded light

source or reflected from a shiny work surface. It will prevent a worker from doing his job efficiently and will interfere with accurate seeing. In attempting to compete with glare, the worker will expend additional energy.

Unshielded lamps are common sources of glare and can reduce visibility as much as 50 percent. All light sources should be properly shielded and located in positions that will not cause annoyance to any worker. It is not enough to shield a lamp for the particular worker using the light. All workers should be shielded from any direct glare. Unshaded windows can also cause severe glare; they should be shaded, or workers should be located so windows are not in their normal field of view.

Reflected glare comes from shiny surfaces that reflect the brightness of a light source. Specular metal and particularly wet metal surfaces may be very annoying sources of glare. The reflected glare can be eliminated by properly locating the light source in

Illumination Levels in Various Food Plants – Recommended Practice

Bakeries*

AREA	Ft.-c. Maintained in Service
Mixing room	20
Face of shelves (vert. ill.)	10
Inside mixing bowl	50**
Fermentation room	10
Make-up room	
Bread	20
Sweet yeast raised products	30
Proofing room	10
Oven room	20
Filling and other ingredients	30
Decorating and icing	
Mechanical	20
Hand	50
Scales and thermometers	30
Wrapping	20
Storage	10
Shipping	20

Candy Making*

Box department	20
Chocolate department	
Husking, winnowing, fat extraction crushing, refining, feeding	10
Bean cleaning and sorting, dipping, packing wrapping	20
Milling	50
Cream making	20
Gum drops and jelly forms	20
Hand decorating	50
Hard candy	
Mixing, cooking, molding	20
Die cutting and sorting	50
Kiss making and wrapping	50

Canneries*

Receiving	
Receiving and dispatching	10
Near sorting & grading units	20
Grading raw materials	20**
Preparations	
Preliminary sorting	20**
Washing raw material	20
Cutting and pitting	20**
Blanchers and spray coolers	20
Final sorting	20**
Canning	
Continuous belt canning	20**
Sink Canning	20**
Hand packing	20**
Container handling	
Conveying and storing	5
Inspection	20**
Processing	
Syruping and brining	20
Exhaust	10
Capping and seaming	20
Cooking and cooling	
Retorts	10
Instrument dials	25
Record keeping	25
Storage and warehouse	
Can unscramblers	10
Inspection	20**
Labeling and cartoning	20
Storage	5
Shipping	10

Flour Mills*

Roll floor	40
Sifter floor	40
Purifier floor	40
Packing	30
Product control station	40
Cleaning screens, man lifts, aisles, bin inspection	20

Milk Processing*

Boilers, bottle storage, storage refrigerators, weighing room	10
Can washers, cooling equipment, pasteurizers, receiving, separators	20
Bottle sorting	50
Bottle washers	50**
Cleaning fittings and pipes	50**
Filling and inspection	50
Gauges, meters, thermometers, scales	30
Vats	50

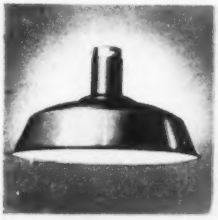
General

Offices	
Intermittent reading and writing	30
Prolonged close work	50
Lunch room, cafeteria	
Kitchen	20
Dining area	10
Laboratories	
Ordinary tasks	30
More critical tasks	50
Service areas	
First aid room	30**
Stairways, toilets, locker rooms	10
Corridors	5

* See References at end of article: Bakeries, Ref. 3; Candy Making, Ref. 5; Canneries, Ref. 2; Flour Mills, Ref. 1; Milk Processing, Ref. 4.

** Specific supplementary lighting is usually required in addition to general illumination.

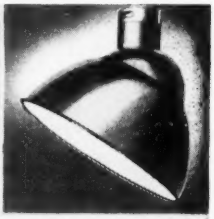
8 Luminaires for Filament Lamps



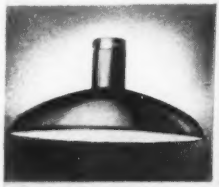
RLM Dome

RLM Glassteel Diffuser

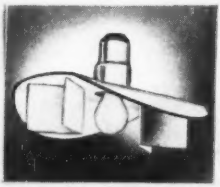
RLM Deep Bowl



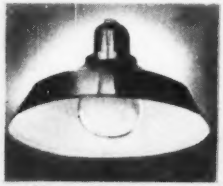
RLM Symmetrical Angle



Shallow Dome



Bin & Stack Luminaire



Vapor-Tight (Dome-Reflector)

Dust-Tight (Class II, Group G)

Their Specifications and Applications

Luminaire	Sizes (Lamp Wattage)	Approx. Mounting Height Range (Ft.)	Applications In Food Processing Plants: Work Areas: Casual Seeing	Work Areas: Critical Seeing	Storage Areas	Utility Rooms	Supplementary Lighting	Stock Bins
General Service								
RLM Dome	75–100	8–10	—	—	—	X	—	—
	150	8–10	—	—	X	X	—	—
	200	10–14	X	—	X	X	—	—
	300–500	12–18	X	—	X	—	—	—
RLM Glassteel Diffuser	150–200	8–10	X	—	—	—	—	—
	300–500	10–14	X	X	—	—	—	—
RLM Deep Bowl	75–100	8–10	—	—	—	—	X	—
	150–200	10–14	X	—	—	—	—	—
	300–500	12–18	X	—	—	—	—	—
	750–1500	18–25	X	—	—	—	—	—
RLM Symmetrical Angle	75–100		—	—	—	—	X	—
	150–200		—	—	—	—	X	—
	300–500		—	—	—	—	X	—
Shallow Dome	75–100	8–10	—	—	X	—	—	—
	150	8–10	—	—	X	—	—	—
	200	10–14	—	—	X	—	—	—
	300–500	12–18	—	—	X	—	—	—
Special Service								
Bin & Stack Luminaire	100	7–8	—	—	—	—	—	X
Vapor-Tight (Dome Reflector)	100	8–10	—	—	—	X	—	—
	150	8–10	X	—	—	—	—	—
	200	10–14	X	—	—	—	—	—
	300–500	12–18	X	—	—	—	—	—
Dust-Tight (Class II, Group G)	100	8–10	X	—	X	—	—	—
	150–200	10–14	X	—	X	—	—	—

relation to the workers so the reflections are not in the direct line of vision. The use of low-brightness light sources will tend to minimize reflected glare because the reflected brightness is proportional to the brightness of the light source.

Effect of Shadows

Soft shadows are necessary to accentuate the depth and form of objects. Harsh shadows are a definite hindrance to quick, comfortable seeing. Multidirectional or mixed light should be maintained throughout the work area to provide diffusion and thus prevent sharp shadows. To attain sufficient diffusion, lighting equipment should be properly selected and located. For most factory spaces, adequate diffusion may be obtained with direct industrial reflectors having wide distribution and having spacings and mounting heights according to the manufacturer's recommendations. Light colored walls and machinery will also improve diffusion and soften shadows.

High wattage filament lamps should not be close to a worker, since the radiant heat can be very uncomfortable. For supplementary lighting applications where it is necessary to provide high ft.-c. values from luminaires mounted close to the worker, fluorescent equipment is recommended. Its radiant heat per unit of light is considerably less than that from filament lamps.

Selecting the Lamp

Today's three principal light sources —filament, mercury and fluorescent lamps—are all suitable for factory lighting. The mercury lamp, however, is primarily used at high mounting heights and therefore will seldom be used in food plants.

Choice between filament and fluores-

5 Luminaires for Fluorescent Lamps

RLM Open or Closed End

RLM Open or Closed End With Shield

RLM Open-End Slimline

Vapor-Tight and Dust-Tight (Class II Group G)

RLM Reflector With Louver

Their Specifications and Applications

Luminaire	No. of Lamps and sizes	Total Luminaire Wattage	Approx. Mounting Height Range (Ft.)	Applications In Food Processing Plants: Work Areas	Storage	Utility Rooms	Supplementary Lighting
General Service							
RLM Open or Closed End	2-40w. 48″ T-12	97.5	10-14	X	X	X	X
	3-40w. 48″ T-12	144.0	10-14	X	—	—	X
	2-90w. 60″ T-17	220.0	12-18	X	—	—	—
RLM Open or Closed End with Shield	2-40w. 48″ T-12	97.5	10*-14	X	—	—	X
RLM Open End Slimline	2-59w. 72″ T-12	156	10-18	X	—	X	X
	2-75w. 96″ T-12	195	10-18	X	—	X	X
Special Service							
Vapor-Tight and Dust-Tight (Class II Group G)	2-40w. 48″ T-12	97.5	10*-14	X	X	—	X
	3-40w. 48″ T-12	144	10*-14	X	—	—	X
RLM Reflector With Louver	2-40w. 48″ T-12	97.5	10*-12	X	—	—	X
	3-40w. 48″ T-12	144	10*-12	X	—	—	X

*Supplementary lighting applications may necessitate mounting as low as 8 ft.

cent lamps depends upon the application, economy, and operating conditions. Both sources have advantages and limitations that should be understood and considered when selecting a plant-lighting system.

The filament lamp is available in a variety of sizes. Initial equipment and lamp costs are low, and only the simplest form of electrical circuit is required. The life of general-service filament lamps is only 750 to 1,000 hr., and efficiency is relatively low compared with the fluorescent lamp. This source is most suitable for distribution circuits of about 120v., but will operate equally well from a.c. or d.c. lines of any common frequency.

The filament coils may be distorted or broken if the lamp is subjected to abnormal shock or vibration while burning. Where such conditions exist, shock absorbing sockets should be installed and/or special vibration service lamps should be used. For excessive shock applications, such as occurs with portable lighting equipment, the rough service type of lamp should be used.

In food plants, filament lamps are most applicable for general lighting in the warehouse, utility rooms, corridors and stairways, and other non-productive areas where relatively low illumination levels are required. In some working areas, however, incandescent lamps can be employed for the general lighting system, while fluorescent equipment is used for the supplementary lighting. Filament lamps are most practical for outdoor lighting for yard, parking areas, and shipping docks.

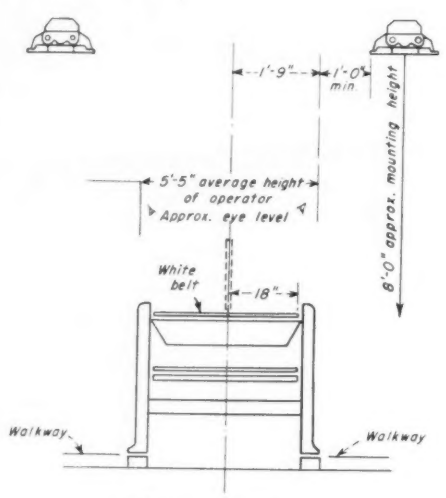
Characteristics of the fluorescent lamp make it an ideal light source for most of the work areas of food plants. This lamp has the advantages of high efficiency, low brightness, long life, minimum radiant heat, and a variety of colors. To obtain the optimum re-

sults from these advantages, their significance and limitations should be understood before applying fluorescent lighting.

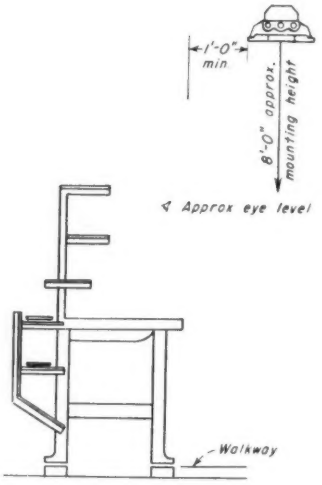
When only filament lamps are available, illumination levels of 20 to 30 ft.-c. were in the upper bracket of practical general illumination levels. Then, 30 ft.-c. required about 4 to 5w. per sq. ft. With fluorescent equipment, 2w. per sq. ft. provides 25 to 30 ft.-c. and 4w. per sq. ft. gives 50 to 60 ft.-c. Thus, fluorescent lighting makes possible higher illumination levels without excessive wattage. Due to this high efficiency, considerable improvements often can be made in existing plants without complete rewiring.

Layout of Lighting In Three Major Food Branches

FIG. 1 – LIGHTING IN A CANNERY



Lighting a sorting table



Lighting a canning sink

FIG. 2 – LIGHTING ROLLING MACHINES IN A FLOUR MILL

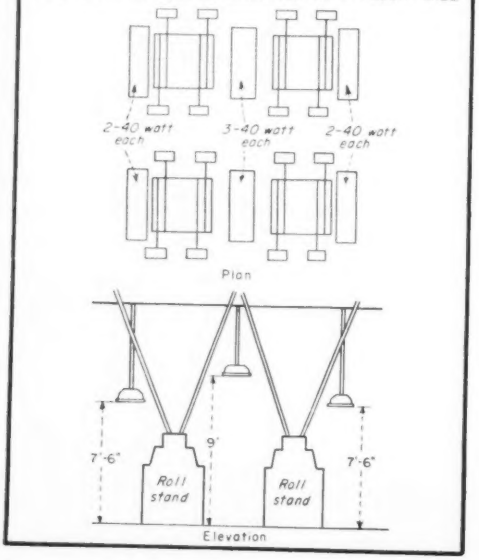
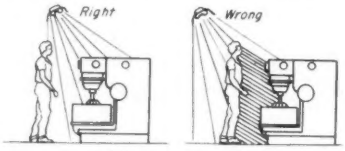
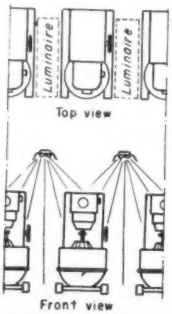


FIG. 3 – LIGHTING MIXING UNITS IN A BAKERY



Lighting a single mixing unit



Lighting a group of mixing units

The brightness of the fluorescent lamp is relatively low, so this source can be used to minimize glare. This does not mean that a bare fluorescent lamp does not cause glare. Exposed fluorescents in the visual field are often annoying, and such lamps should be shielded by reflectors, louvers, or suitable diffusing material.

The fluorescent lamp has been referred to as a "cold light" source. This is not true because, like other electrical apparatus, it does emit heat in proportion to its total wattage. However, the heat per ft.-c. on a work surface is but a small part of that from filament lamps, for two reasons: (1) The high efficiency of fluorescent lamps means fewer total watts for a given lighting task; (2) the fluorescent lamp actually directs less radiant heat toward the workers than does the filament lamp of equal wattage. Because of these facts, fluorescent lighting allows concentration of as much as several hundred ft.-c. for a critical work-area seeing task without subjecting the operator to annoying heat.

A great variety of colors of fluorescent lamps are now available. For instance, there are seven whites alone—daylight, white, standard cool white, deluxe cool white, standard warm white, deluxe warm white, and soft white.

Light for Grading and Sorting

One of the major problems in canneries is the lighting of sorting and canning belts for the separation of quality grades where maturity is an important factor. Maturity of most products is judged primarily by color, so selection presents problems in detecting characteristic colors and small differences between these colors.

An extensive investigation[2] of colored lights to find the spectral quality of illumination most suitable for increasing color differences was made at Stanford University. A wide variety of incandescent, vapor and fluorescent lamps of all colors was used in conjunction with many color filters.

It was found that colored light usually decreased, rather than increased, a person's ability to detect color differences. This study indicated that a continuous light spectrum—in other words, a white light—is essential. For most sorting and canning operations the white fluorescent lamp is adequate. The light source best suited for extremely critical color-difference problems is one similar to natural daylight from the north sky. For such cases, the standard cool white fluorescent lamp is usually satisfactory. But where a closer approximation of daylight is needed, incandescent lamps with daylight filters are generally used. A similar effect can be approached by a combination of incandescent and fluorescent lamps.

The deluxe cool-white fluorescent lamp may also meet the requirements for these more critical color sorting problems, and should be tried if the standard cool white unit is not satisfactory.

Where a warm color quality is preferred, the standard warm white is generally suitable and the deluxe warm white may be used where critical color rendition is essential.

Types and Sizes of Fluorescents

Two general types of fluorescent lamps available are the standard type, in which a starter is required in the electrical circuit, and the instant start type that requires no starter. Both have advantages. The starter type is the most efficient, has the lowest initial cost and the greatest lamp life. The instant start type, which includes the slimline fluorescent lamps, are gaining acceptance rapidly because the elimination of the starter simplifies maintenance.

The various kinds and sizes of fluorescents for general lighting are listed, with their characteristics, in Table II. The 40w. preheat lamp (requiring a starter) is in greatest demand today because of its economy, and because it is readily obtained and easy to handle. The 90w. lamp, lower in efficiency, has the main advantages of maximum light output per foot as compared to all other lamps. This means a minimum number of lamps are required for an installation.

The demand for slimline lamps is increasing, particularly for the 1½ in. dia. type available in 4, 6, and 8-ft. lengths. The latter lamp is the most efficient and therefore shows the lowest overall lighting cost. However, it may be difficult to handle in some plants. The 6-ft. lamp is easier to handle and overall lighting costs are only slightly higher than in the 8-ft. length. This lamp will become popular in industry in the future because of good operating economy and simplified maintenance.

The 4-ft. lamp is the least efficient of this group. Its use may be limited to substitutions in lighting plans where neither the 6 or 8-ft. lamps can be accommodated.

Types of Luminaires

A wide variety of filament and fluorescent luminaires are available. Tables III and IV list the most common types suitable for food plants. In these tables, they are classified for general and special service. The former equipment is intended for general lighting where no special atmospheric conditions exist. The reflectors of these open-type luminaires are porcelain enameled steel that is exceptionally durable and easy to clean.

For filament lamps, the RLM Standard Dome Reflector is used most extensively for general lighting. The RLM Deep Bowl Reflector may also be used for general lighting and provides greater shielding of the lamp. The RLM Symmetrical Angle Reflector is designed for lighting vertical surfaces and for supplementary applications requiring directional lighting on vertical or oblique surfaces.

The RLM Glassteel Diffuser consists of a reflector similar in shape to the RLM Dome. It has a diffusing globe that reduces the lamp brightness. This unit was used extensively before fluorescent equipment was available for general lighting.

The general-service industrial-fluorescent luminaires may be secured for individual mounting or for installation in continuous rows. The latter method is used where illumination levels of more than 30 to 35 ft.-c. are desired. Most fluorescent types are available for two lamps per reflector. This permits the use of the standard two-lamp lead-lag type fluorescent operating ballast that economically corrects power factor and prevents annoying stroboscopic effects. However, a few luminaire types use three lamps per reflector, in which case either a three-lamp ballast or one single and one two-lamp are used.

Lighting for Specific Operations

The special service luminaires include the vapor-tight, the dust-tight, and various types of directional concentrators. Vapor-tight equipment is used where the atmosphere contains a high moisture content or where steam and water vapor rise around the lighting equipment. Vapor-tight equipment is designed to exclude moisture or corrosive vapors from the lamp and electrical components of the luminaire.

The equipment classified as dust-tight, and approved for Class II Group G hazardous locations (Article 500, National Electric Code), should be used where the atmosphere contains excessive concentration of explosive dust, such as flour mills, and other grain handling locations. This equipment will also reduce the lighting maintenance problem created by the accumulation of dust and grease.

General lighting of the proper quantity and quality is sufficient for the average seeing-tasks in the work areas of food plants. However, certain specific operations require lighting arranged in relation to the particular process or seeing task. This specific lighting may supplement the general illumination, or may consist of a localized arrangement of the general

(*Turn to page* 203)

Where Retail Dollars Go

Production and Marketing Charges As a Percentage of the Retail Price of Canned Fruits and Vegetables, 1949-50 Season[1]

	Cling Peaches (percent)	Free-stone Peaches (percent)	Bartlett Pears (percent)	Green Beans (percent)	Sweet Corn (percent)	Green Peas (percent)	Toma-toes (percent)
Return to Producer of Raw Product	18	16	18	25	20	24	24
Cost of Processing:							
Containers and Supplies	22	20	18	14	19	18	18
Direct labor	8	13	10	6	7	5	8
Selling and Administration	7	7	6	7	11	9	8
Other costs	12	10	11	9	13	13	13
Processor's Profits [2]	—4	1	2	6	—3	2	2
Total Processing	45	51	47	42	47	47	49
Transportation	13	10	10	5	5	5	5
Wholesale Margin	5	6	7	7	6	6	3
Retail Margin	19	17	18	21	22	18	19
Total	100	100	100	100	100	100	100

[1] From *The Marketing and Transportation Situation*, BAE, May 1951, Table 5.
[2] Before payment of income taxes.

High-Profit Claims Fade Under Probe of Canners

Senate investigators find that farm prices actually are related to food costs—something that annual statements could have told them all along

J. A. J. JONES
Associate Editor "Food Engineering"

"Exorbitant profits" as credited to the food industry did a bit of shrinking recently on contact with a Senate committee's "analysis of operating cost and profit of a representative group of fruit and vegetable canners for the years 1946 to date."

When the hearings opened in March, Sen. Allen J. Ellender, Sr., committee chairman, said his committee was concerned about recent advances in food prices and in statements in the press blaming the farmers for these increases.

"Many of the farm products," an early committee statement said, "were already sold by farmers before the price increases occurred. In fact," this statement added, "in a number of cases, farmers received lower prices for their products in 1950 than in 1949, even though these products are now selling at sharply higher retail prices."

But the completed study does not seem to have justified the committee's initial concern. At least the published summary of the report manages to obscure farm prices in a diffusion of findings that lend further ambiguity to an already confused consumer state of mind.

Well Mixed Bases

First, the report summary tells us that "Payments to producers for raw products canned represent less than 40 percent of the sales value of the canned products. Containers, cases and labels cost almost as much as the materials canned in some recent years." Note that the basis here is wholesale value.

To estimate profits, we skip over to processor's invested capital for a basis. And the committee finds here that "Profits on invested capital (after taxes) reached the extraordinarily high level of 35 percent the first year after price controls were removed, but losses were more common than profits in both the 1948 and 1949 operations. Increased demand in recent months has resulted in substantial profits once again in the 1950 canning season."

Then we shift again—this time to total canning costs, of which the report finds labor costs are "around 17 to 20 percent and have not increased in relation to other costs in recent years." And coming full circle, we get back to the wholesale dollar with the statement that "Distribution and selling costs represent approximately 10 percent . . . and do not show any distinct trend."

Not until the last three pages of the summary do we see cost-profits with a common denominator. By this time, however, the picture is quite subdued. Based on processor sales, the net profit for 24 companies—a different set from those reporting on invested capital—amounted to 8 percent in 1946-47. And in subsequent years it dropped to 4, 2, 0 and 5 percent, respectively.

For those who might have shared the committee's original concern, the summary does get around to providing some solace. In what they call the "Range in Increase in 1951 Contract Prices in Specific Areas," they reveal that tomatoes for processing have been upped 20 to 35 percent; green peas, 12 to 25 percent; sweet corn, 24 to 40 percent; snap beans, 8 to 12 percent; and green lima beans, 12 to 13 percent.

In the breakdown of both the processor sales dollar and the retail value, however, the tables taken from the committee's summary (reproduced on this page) offer some interesting information.

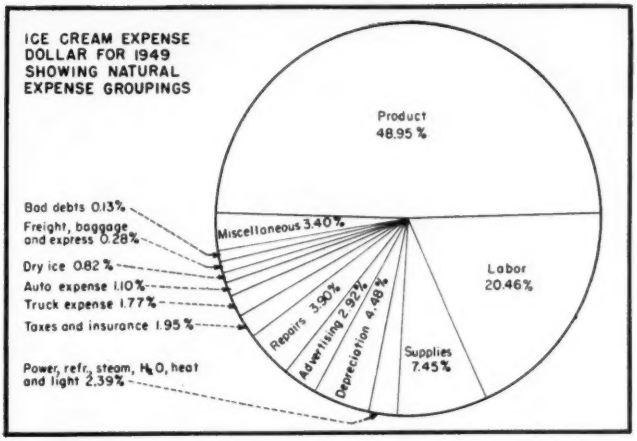
Other Branches Pay Out

Likewise, the Milk Industry Foundation has developed an enlightening profit picture from a study based on total sales of $1,014,915,023 made by 313 milk companies in 42 states, D. C., and Hawaii. These figures, adding up to the dollar the average milk company receives, show:

Material Costs	.6185
Salaries and Wages	.2080
All Plant Delivery and Office Supplies	.0525
Containers	.0405
Adv., Insurance and Depreciation	.0269
Taxes & Licenses	.0217
All Other Expense	.0113
Net Profit	.0206

In the ice cream field, the International Assn. of Ice Cream Manufacturers takes the 1949 expense dollar apart to show materials and labor costs to be running to almost 70 percent. Materials came to 48.95 percent and labor to 20.46 percent, with supplies at 7.45 percent, a poor third in the lineup.

Data on four frozen food items, compiled by the Bureau of Agricultural Economics, indicate processor profits of from 5 to 9 percent of the retail price for the 1949-50 pack. Complete breakdown for the four foods (also shown in one of our tables) reflects the high costs of refrigerated distribution, particularly at the retail level.



Similarly, for the controversial meat packing industry, the American Meat Institute's figures for 1949 show 78c. of every wholesale dollar going for livestock and other farm products; 10.7c. goes into payrolls; 9.6c. is taken up by "other expenses;" 1.0c. is paid in taxes—with 7/10c. left for profits. More significant in relation to meat prices is the profit per pound, which in 1949 was calculated to have amounted to but $\frac{1}{3}$¢.

Same With Individual Companies

Nor does the pattern change with large individual companies in various branches of the industry. Sunshine Biscuit, for example, reveals in its annual statement for 1950 that out of gross sales of close to $105,000,000, 44.2 percent was paid for raw materials and supplies; 25.8 percent represented the payroll; 16 percent went for all other expenses; while 6.8 percent was paid in taxes. This left 7.2 percent for earnings, of which 3.7 percent was paid in dividends and 3.5 percent was retained.

Beatrice Foods went even higher in payment for raw materials, reaching 64.6 percent on gross 1950 sales exceeding $205,000,000. But only 2.1 percent was left for earnings after the payroll ate 14.8 percent, supplies and other expenses 15.5 percent, and taxes 3 percent.

Borden's in 1940 paid out 48¾ percent of its sales dollar to farmers, 18 percent to employees, 24½ percent for other operating expenses, 3¼ percent in taxes, and 1¾ percent for depreciation. Thus, on sales of $631,-114,120, only 2 percent was paid in dividends and 1¼ percent retained.

Supplies, goods, and services are lumped under one heading in General Foods' statement, issued recently. For them the company paid 76.6 percent out of a total income of $592,500,000. Employees got 12.9 percent, taxes 5 percent, depreciation 1 percent; and interest 0.1 percent. Thus, 4.4 percent was left for earnings, with 2.3 percent going into dividends and 2.1 percent retained.

Production and Marketing Charges as a Percentage of the Retail Price of Frozen Fruits and Vegetables, 1949-50[1]

	Peaches (percent)	Strawberries (percent)	Baby Lima Beans (percent)	Peas (percent)
Returns to Producer of Raw Product	8	29	21	21
Cost of Processing:				
Containers and supplies	17	10	5	8
Direct labor	12	5	7	5
Selling and administration	6	7	6	7
Other costs	15	9	16	17
Processor's Profits [2]	5	8	9	6
Total Processing	54	39	43	43
Transportation	7	4	3	5
Wholesale Margin	9	9	12	10
Retail Margin	21	19	21	21
Total	100	100	100	100

Costs and Profits As a Percentage Of Canners' Sales

	1946–47 (percent)	1947–48 (percent)	1948–49 (percent)	1949–50 (percent)	1950–51 (percent)
Cost of Operations					
Raw products	37	33	37	31	34
Labor	18	20	19	20	17
All other	32	40	41	48	39
Total	87	93	97	99	90
Net Income Before Taxes	13	7	3	1	10
Provision for Income Tax	5	3	1	1	5
Net Profit After Tax	8	4	2	0	5
Cases Sold as a Percentage of Cases Packed	98	97	80	98	113

[1] From *The Marketing and Transportation Situation*, BAE, May 1951, Table 6.
[2] Before payment of income taxes.

BEFORE a can lining is approved, it must be tested under commercial conditions. These experiments are expensive and time-consuming because of specific requirements of products. Tested here are enamel-linings for cans of corn-on-the-cob.

For Protection Keyed to the Product:

Those Synthetic Can Linings

Applied to tin-coated steel plate, they are tailor-made to provide better barrier between canned food and metal . . . Faster enamel curing seen as imminent development

S. L. FLUGGE
Research Dept., Continental Can Co., Chicago

Today, canned food products are being provided additional safeguards through the use of organic-protective linings applied to the metal containers. ■ **Among the protective linings now supplementing the conventional tin coating are these types: Oleoresinous, phenol-formaldehyde, vinyl, and wax.**

The trend is indicated by the fact that as many as 20 different can linings are now being employed. And with these specially formulated coatings comprising a major feature of the container, we have specific cans for specific products, the choice dependent upon the exacting requirements of the foods in question.

True, attempts have been made, at various times, to develop a "universal" lining that could be used for almost all cans and products. But up to the present time, these efforts have been unsuccessful.

More Resins Available

Only a short time ago, those who sought can linings were restricted to a few oleoresinous enamels made with an ester gum or a natural resin and tung oil, a small quantity of drier, and the required amount of thinner. Presently-used oleoresinous linings will differ, if at all, in that some synthetic resin probably has replaced the natural resin or simple ester gum, and dehydrated castor oil may take the place of tung oil in some formulations.

Today, however, a great number of synthetic resins are available for manufacturing oleoresinous can linings. These include the phenolic modified rosin esters, maleic modified rosin esters, unmodified phenolics, petroleum resins, and the more recently developed epoxy type resins.

For a long time, tung was the only oil extensively used in can lining where flavor was an important characteristic. Linseed and other slower drying oils were sometimes employed in protective coatings both for the outside and

inside of cans, where possibilities of affecting flavor and odor of foods were not serious. However, tung oil, with its outstanding characteristics, was usually the principal if not the only oil used in most can linings before World War II. Restrictions on the use of tung oil just prior to and during that war brought about an extensive search for substitutes for everything, including tung oil. It was then that dehydrated castor oil was discovered to be satisfactory for certain oleoresinous formulations, particularly for chemically treated steel plate.

Discoloration Problem

Oleoresinous can linings for protection of foods of high or fairly high protein content (such as corn, peas, meat, and fish) generally include approximately 15 percent of fine-particle zinc oxide. This oxide is added for its chemical reactivity and not as a pigment. During heat sterilization of canned protein-containing products, some of the proteins break down and release sulfides that react with the zinc oxide to produce white or essentially colorless zinc compounds. In the absence of zinc oxide, these sulfides react with tin or iron to form black sulfides that discolor the tin plate (even through the enamel). When sufficient iron is exposed, there may be produced a voluminous black iron sulfide that will adversely affect the appearance of the product.

Introduction of the so-called phenolic enamel (phenol-formaldehyde type without oil modification) as a can lining provided a more impermeable film than the oleoresins. Although this phenolic-can lining has been characterized by considerable sensitivity to plate conditions, a minimum of flexibility, and some tendency to impart a characteristic flavor to certain products, its use has increased steadily.

A good phenolic enamel does not require zinc oxide for sulfide-stain resistance. Moreover, it is not softened by animal fats, thus making it well suited for many meats and meat products. Furthermore, recent improvements in this type of can lining may further expand its use.

About the Vinyls

With their toughness and freedom from flavor, the vinyls are particularly well adapted for coating cans to be used for beer and other products adversely affected by metals. However, here, sterilization of the canned foods should be at temperatures of about 200 deg. F. or lower.

Vinyls, however, usually require special modification, or they must be applied over a base-coat enamel. Higher processing temperatures and the presence of water generally produce a white blush (clouding) in the vinyl film. For some products, this blush can be minimized, if not eliminated, by suitable modification, including pigmentation or the use of the recent thermosetting formulations that give more process-resistance. However, very large quantities of vinyls are employed and their use can be expected to increase appreciably under normal conditions.

Wax-type can linings are used principally for assembled beer cans with crown closures. Such cans are flush-lined with molten wax, the excess drained off, and the final film formed by solidification of the wax. Formation of this film after the can has been fabricated obviously eliminates disruption of the film during such operation, and thus keeps metal exposure to a minimum.

However, such films also have limitations, one of the principal ones being their relatively low softening and melting points. Higher-melting waxes are available, but these are also more brittle and therefore not satisfactory.

Requirements of Liners

To be acceptable as can linings, organic-protective coatings must be: (1) Non-toxic and free from flavors or odors that adversely affect canned products; (2) resistant to the foods, providing the required barrier between product and metal container; (3) readily applied and rapidly cured on the various types of commercial can-making plate or can structures; (4) able to withstand the mechanical actions to which they will be subjected during can-making and subsequent uses; and (5) economical.

Very important in considering a food-can lining is the gage of its freedom from toxicity, odors, and flavors. Can linings now in use have been formulated with materials that have been extensively tested and evaluated for their effects on canned food. Many of them have been used for a great number of years as can linings, and for similar purposes, without any toxic effects or objectionable odors and flavors.

It may be noted that the Quartermaster Corps requires that any protective organic coatings on the inside or outside of food containers must be approved from the standpoint of toxicity by the Surgeon General's Office. This approval applies to special protective coatings, such as the camouflage enamels and also the regular linings used for civilian canned foods that later may be purchased for the Armed Forces.

Enamels Imparting Off Flavor

In the development and evaluation of an inside enamel for cans, flavor-testing receives considerable attention. Testers must detect flavors qualitatively and quantitatively, and also evaluate the significance of test data. The flavor of every product is affected to some extent by the container in which it is packed. After some time, consumers become more or less accustomed to the flavor, which may be associated with a specific type of container, and thus they may reject many other cans.

For example, enamel linings have been accused of imparting an "enamel flavor" when used in cans carrying products normally packed in plain tin cans. However, what was actually noted was the absence of the very small amounts of dissolved tin normally present only in the product packed in the plain can. Tomato juice having a few ppm. of tin is generally preferred to the same juice without this small amount of tin.

Some foods bleach when exposed to tin. Although this action is very objectionable with many products—particularly the red fruits—it is avoided by the use of a suitable can lining. However, there are instances when this bleaching action is desirable. This is particularly true with the lighter colored products, such as sauerkraut,

The So-Called Tin Can

—is taken for granted and little understood, except by those closely associated with its manufacture. To begin with, the "tinplate" from which it is made is not tinplate, as most people normally interpret the term, but is a mild steel plate coated with a film of tin varying in thickness from approximately 0.000015 to 0.000100 in., depending upon the grade.

This thin film of tin is desirable because steel plate itself does not have adequate resistance to the corrosive effect of the atmosphere and of the many products packed in cans. Although cans made from plain tinplate are suitable for many products, there are a number of canned foods that are either adversely affected by exposure to the metal in the cans or that tend, themselves, to corrode the containers. To can these products successfully, it is necessary to use a suitable organic protective coating as an additional barrier between the product and the steel plate.

also grapefruit juice and segments. This slight bleaching action compensates for the normal darkening effect due to processing or sterilization.

Peaches and pears, packed in cans completely enameled inside, will darken somewhat and take on flavors slightly different from those of the same products put up in cans with appreciable exposed areas of plain tin. Even though some individuals may prefer this slightly darker color and different flavor, it is doubtful if such enameled cans will be produced under current conditions because the presence of an appreciable area of plain tin greatly increases the shelf-life of this product.

Corrosion Problems

An "all-enameled" can is coated, under present manufacturing conditions, over all but a few, very small areas. As previously reported by several authors, corrosion (attended by the formation of sufficient hydrogen to displace the vacuum normally found in canned foods and to cause the ends to swell) may occur sooner in enameled cans than in plain or partly plain cans. In some cases, the corrosion may be confined to localized areas, with the result that the can may be perforated by one or more "pinholes." Contrary to some reasoning, not all corrosion problems can be eliminated by the use of now-available can linings.

An important factor to be borne in mind is that the can lining cannot be evaluated alone, but must be considered in conjunction with the plate to which it is applied. Steel, terne and tinplate may carry a small quantity of palm oil, cottonseed oil, or perhaps dibutyl sebacate, which act to some extent as a lubricant and, on steel plate, as a protection against atmospheric corrosion.

Can linings should cover commercial quality plate in a uniform film without the formation of "enamel eyes" —those areas around which most of the enamel has drawn away. These linings must not be too sensitive to varying amounts of oxide on the plate surface. Oxide films are present on all plate but vary both qualitatively and quantitatively. Usually, excessive oxide films lower the adhesive characteristics of the enamel films to the base plate. This may be due to the film's relative adhesion to various oxidized surfaces, the lower adhesive characteristics of the oxide film to the plate, or the effect that the oxides may have had on the cure of the film.

It is well known that hardness, adhesion, flexibility, chemical resistance, and other properties, will vary with the degree to which the film is cured. Moreover, this cure is a function of the time and temperature of the bake. It may be less known, but equally true, that the surface to which the film is applied has an effect on the cure. As an example, an oleoresinous enamel was applied and baked over a sheet of "old" tin plate, half of which had been electrolytically cleaned to remove the heavy oxide film. The enamel over the heavily oxidized area was cured to a greater degree than that over the cleaned area, and this performance was approximately equivalent to that obtained by a 400-deg. F. bake (rather than to a 380-deg. F. bake).

This enamel was too sensitive to variations in surface oxide for satisfactory commercial production, but it illustrates the catalytic effect the plate surface may have on the curing processes during baking.

At this point, it may be well to explain that the adhesion requirements of food-can linings must be considered to meet two different conditions: First, the fabrication of the enameled plate into a can produces, in the plate and the enamel film, stresses and strains that may bring losses in adhesion, or peeling. This type of peeling is caused by physical distortion of the base metal.

However, peeling or loss of adhesion also may occur on the inside of enameled cans packed with certain products, even though the areas in question have been subjected to little or no stress and strain.

This latter type of peeling is dependent upon, and accelerated by, the presence of water and oxygen. Thus, under unfavorable conditions, such peeling may be observed in the headspace above the canned product. Several accelerated tests are available to measure this loss of adhesion. As with many of the evaluating tests for can linings, these tests require some can-making, closing, and processing equipment.

Applying the Lining

Most linings are applied to flat sheets by roller coaters, and are then baked in continuous ovens. The enameled plate is then made into cans. The manufacturing operations involve considerable bending, drawing, and forming of the enameled plate at certain areas. And, in passing along from one step of an operation to another at high speed, many areas are subjected to frictional forces.

To withstand these operations satisfactorily, can linings must be flexible, scratch-and-abrasive-resistant, and yet adhere to the metal plate. Most linings must also be resistant to the heat required for soldering operations.

Some linings are sprayed on cans or their component parts. By applying the protective coating after at least some of the more severe mechanical operations of can-making, the scratches, abrasions and fractures are minimized. Also, a more efficient barrier between product and metal is obtained. The spray-method of applying enamel films was first extensively used in the manufacture of beer cans. Indicated is an increase in this means of applying can linings.

It is desirable to use can linings that have a reasonable degree of latitude in film weight and that will bake without failure even when not applied exactly to specifications. The roller coating and spraying machines provide means for close control of film weight. The films, of course, are relatively thin—being about 0.0001 to 0.0004 in. (weight of approximately 2 to 6 mg. per sq. in.). Control limits generally allow for film-weight variations of ± 0.5 mg. per sq. in. from the specified value.

Controlling Enamel Bake

Generally, baking temperatures are not higher than about 425-deg. F. plate temperature. Control of temperatures in modern continuous plate-enameling ovens has improved greatly over the past few years, and tolerances of ± 5 deg. F. from the nominal temperature can be maintained after the plate has reached its baking temperature. Older ovens do not control temperatures as well, hence there may be considerable difference between the maximum and minimum temperature at a given time on any one sheet during its travel through a large part of the oven. This condition is particularly true when the speed of the oven has been increased over that for which it was originally designed.

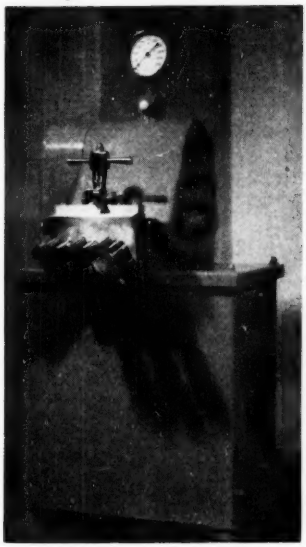
As a result of the increased use of can linings, enameling facilities often have been inadequate. This fact, and the ever present competitive incentive, have resulted in continued pressure to shorten the baking time and thereby increase production. About 30 years ago, the time required to bake a can lining was almost 1 hr. This time was then reduced to about 30 min. some 20 years ago. And at the present time, baking in the best ovens takes less than 15 min.

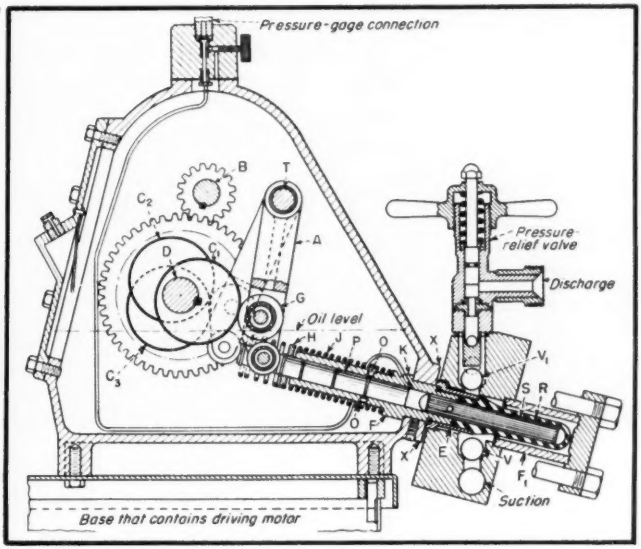
As indicated, the reduction in baking time has been made possible by the use of higher and better control of temperatures. In this way, the coated plate reaches the baking temperature within about 2 min., and it is kept at this selected temperature within ± 5 deg. F. until leaving the oven.

The maximum baking temperature for enameled tinplate has been maintained somewhat below the melting point of tin (approximately 450 deg. F.) This has been done not so much because the melting of the thin tin coating would be objectionable, but

(*Turn to page* 158)

NEW EQUIPMENT & SUPPLIES





Unique Homogenizer Is Highly Sanitary

Chance of product contamination is reported to be eliminated in a new, radically different type of homogenizer.

Here, there is a complete separation between the actuating mechanism and the material being processed. The unit, maker states, can be taken apart, cleaned and put together in 10 min.

Known as the Hydropulse, it comprises a combination of simple hydraulic components. Suction and pressure are alternately obtained by breathing pulsators actuated by hydraulic pistons. The driving mechanism is constantly bathed in oil.

Referring to drawing (above), the section to the right of *X* is the pump with its ball suction and discharge valves and pressure relief valve. The driving mechanism to the left of *X* has a cam shaft *D* on which are three cams C_1, C_2, and C_3 that drive actuating pistons *P*. Cam shaft *D* gears to shaft *B* driven through a multiple V-belt by a motor in the unit's base. Pistons *P*, their cylinders, and part of their operating mechanism, are continuously immersed in the actuating fluid (oil).

Pulsator *R*, made of synthetic rubber, is bonded to sleeve *E*. A metal support *S*, inside the pulsator, connects to cylinder *F*, inside of which actuating piston *P* operates. This piston has a collar *H* that takes tension of spring *J*.

Arm *A* pivots at *T*. Cam C_1 rides against ball-bearing roller *G* on a stub shaft in *A*. A second ball-bearing roller in *A* contacts end of piston *P*. In drawing, cam C_1 has pushed piston *P* to discharge position against tension of spring *J*. When cam shaft makes a half revolution, cam C_1 will have moved 180 deg. to let piston *P* move to left and uncover ports *O* to make up any slight oil leakage from the cylinder ready for the discharge stroke.

Pressure inside rubber pulsator is relieved and it contracts onto its support, to create a vacuum inside cylinder F_2. Liquid then flows into cylinder through ball suction valve *V*. When cam C_1 makes another half revolution, arm *A* moves piston *P* to position shown and drives oil into rubber pulsator *R*. Pulsator expands and forces liquid out of cylinder F_1 through ball discharge valve V_1 and out discharge.

Pump, being a triplex design, makes three pulsations 120 deg. apart for each revolution of cam shaft, to give fairly constant flow. Discharge pressure is measured with gage connected into actuating cylinder at *K*.

Because the pumping end of the unit has no rubbing parts it can run dry without damage and is also self priming. These units are built in four sizes, from 0.5 to 2.5 gpm., and for pressures up to 3,000 psi. (but have been operated at 6,000 psi).

All parts of the unit in contact with the pumped liquid are 18-8 stainless steel, except the pulsator, which is made of an oderless and tasteless synthetic rubber, impervious to oil and good for temperatures up to 220 deg. F.—*Pioneer Division, Scott & Williams, Inc., Empire State Bldg., New York City.*

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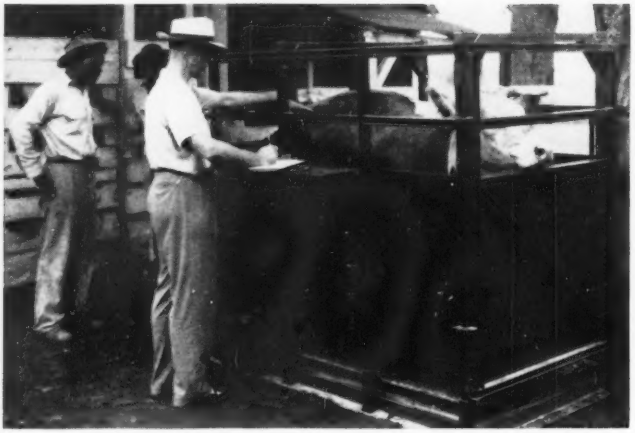
Cattle Scale Is Portable, Rugged



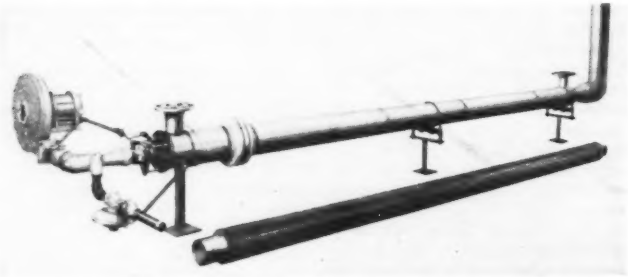
A new type of portable, hydraulic scale for the weighing of cattle has been developed at the Georgia Tech Engineering Experiment Station in cooperation with the Georgia Agricultural Experiment Station. The equipment is specially designed to withstand rough handling in the field and yet produce accuracy comparable with permanently installed types of scales.

There has been a growing demand for such a unit by both cattle raisers and buyers, especially in the South where cattle raising is rapidly replacing cotton as the number one money crop.

Unit operates on the principle of an hydraulic jack. The mechanism has been refined for simplicity and ruggedness and to withstand shock.

Circle 118A on Reader Service Card

Close Limit Regulation Notable in New Heater

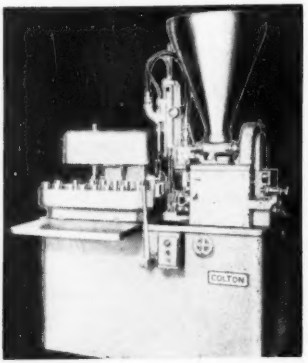


Accurate control of processing when air is used in dehydrating foods is reported with use of this new heater.

It comprises a stainless steel outer shell with expansion section and an Inconel center tube with integrally welded, extended surface nickel fins. Equipment is designed to heat air, special atmospheres, gases or liquids without contaminating them with the products of combustion. Heaters can be controlled, it is stated, within very close limits. Fuel may be either oil or gas. Several units now in service have, according to maker, shown high thermal efficiency.

Since there are no refractories to heat, the units are quick starting and can be put on full stream in just a few minutes. Reported easily mounted on floor or overhead, equipment is furnished with burner, fan, and control units.—*Brown Fintube Co., Elyria, Ohio.*

Circle 118B on Reader Service Card



Speed, Accuracy Mark New Tube Filler

New standards in speed, precision and economy in filling tubes with creams, pastes, powders and liquids are claimed for the No. 175 automatic machine.

The automatic work cycle begins with placement of tubes in vertically mounted holders. Then tubes move to a filling head that puts product into them from the bottom up (preventing air pockets), with an exactly metered quantity of material fed from a 15 gal. hopper. Tubes then pass to closing and crimping stations that produce a quadruple-fold closure. Code marking jaws are supplied on request.

All parts are easily accessible for cleaning and adjustment, also for changeover to different-size tubes. Operation is safe and simple—well within the ability of the average operator.

Optional equipment available as extras include a device that cleans the tube by air and vacuum, a cap tightener, and a "no tube-no fill" attachment. For heavy materials that tend to settle, hopper may be equipped with a mechanical agitator, power operated. For materials that tend to solidify, hopper may be equipped with a heater adjustable to temperature required to maintain uniform flow.

Four models are available: Standard Single, Standard Twin, Special Single, and Special Twin.

Standard Single has a capacity per minute of 55 tubes, ½-to-1½ in. dia. by 7¼ in. long. Standard cylinder capacity is 7 fluid oz. Machine is powered by 1 hp. motor. Standard Twin has capacity per minute of 85 tubes, up to ¾ in. dia. by 7¼-in. long. —*Arthur Colton Co., Div. Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7.*

Circle 118C on Reader Service Card

Sanitary Design Highlights New Nut Breaker

Confectioners, bakers and ice cream manufacturers are now offered a completely new sanitary machine for uniform breaking of all kinds of nut meats.

Machine is reported suitable for handling peanuts, almonds, walnuts, filberts, brazil nuts and pecans. It may also be employed to break hard candies into pieces for use in ice cream.

Four objectives in design—sanitation, ease of cleaning, interchangable parts, and ruggedness—have been incorporated in the unit's construction.

Circle 119A on Reader Service Card

No tools are needed to take the machine apart. Turning of a single wing nut releases the top hopper, which swings back to expose the breaking rollers and other components. The parts can be easily lifted out by hand. Maker states unit can be disassembled within 30 sec. preparatory to cleaning.

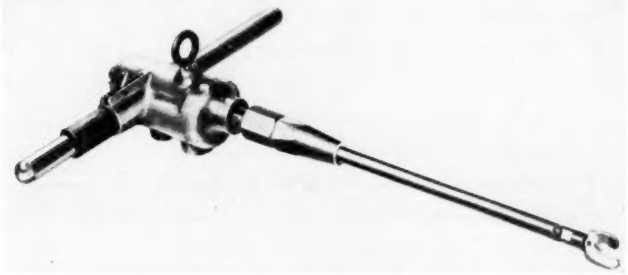
Operation is on a gravity feed principle, and there is no interference with the flow of nuts, since an adjustable stainless regulator prevents choking in the rollers. A receiving box for broken nut meat is supplied with each machine, and for those who desire to screen the nuts in various sizes, shaking screens and receiving boxes are available.

One set of breaking rollers (⅛ in. or ¼ in. size grooves) is included with each machine. Special size breaking rollers are also made—⅜ in. and ½ in., as well as a 1/16 in. size for fine breaking. The breaking rollers themselves are adjustable for various sizes in addition to those mentioned above, making it possible to grade and size the nut meats up to the size of the grooves in the unit's breaking rollers.

All parts of the breaker are made from jigs, thus proper duplication is assured when ordering a new part.

Power is supplied by a direct-connected gearhead a. c. motor with built in speed reducing unit and simple clutch arrangement.—*Thos. Mills & Bros., Inc.*, 1301 *N. 8th St., Philadelphia* 22.

Fast-Acting Tube Cleaner for Heat Exchangers



Process heat exchangers are reported serviced fast and economically with use of this new straight-tube cleaner.

Called Model TP-301 it is, according to maker, the only one that immediately removes deposits from completely plugged heat exchanger tubes. Because of its powerful action, the unit does the job in fewer man-hours.

Circle 119B on Reader Service Card

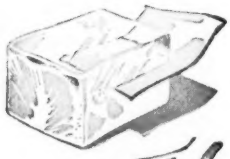
Many improvements have been built into the cleaner. It is lighter in weight—only 15 lb., and is shorter—only 13 in. overall. New model provides increased capacity: From ⅜ in. up to 2½ in. or even 3 in. o. d. tubes. Hollow shafting is available in one piece up to 20 ft. or in sectional threaded lengths, if desired. Minimum practical working headroom is 5 ft.

This positive air driven, rotary shaft, drill type tool scavenges the tube with air or water while cleaning. It operates on air pressure as low as 50 lb.—*Thomas C. Wilson, Inc.*, 21-11 *44th Ave., Long Island City* 1, *N. Y.*

soak it...

boil it...

freeze it...



grease it...

Patapar can take it!

Wonderful for:

- **Butter wrappers**
- **Ham boiler liners**
- **Deep freeze wraps**
- **Can liners**
- **Fish wrappers**
- **Cheese wrappers**
- **Margarine wrappers**
- **Milk and cream can gaskets**
- **Bacon wrappers**
- **Vegetable wraps**
- ***and many other uses***

Patapar is furnished plain or beautifully printed in one or more colors.

Patapar
HI-WET-STRENGTH
GREASE-RESISTING PARCHMENT

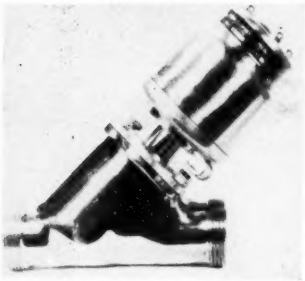
There's no paper quite like Patapar Vegetable Parchment. Soak it in water—boil it. Patapar stays strong and beautiful. Freeze it—thaw it out. No loss of strength. Wrap greasy things in it. The grease doesn't come through.

Standard weights and types of Patapar take care of most needs. For special problems there are special types of Patapar—179 different types in all. If you have a special problem, why not tell us about it?

This Keymark, nationally advertised symbol of wrapper protection, can be included on printed Patapar wrappers.

Paterson Parchment Paper Company
Bristol, Pennsylvania
Headquarters for Vegetable Parchment since 1885
West Coast Plant: 340 Bryant Street, San Francisco 7, California
Sales Offices: 122 E. 42nd Street, New York 17, N. Y. • 111 W. Washington St., Chicago 2, Ill.

Remotely-Operated Valve For Sanitary Lines



To allow centralized control of the flow of milk, juices, and other liquids in sanitary lines, new remotely-operated valves have been designed.

Powered by pneumatic actuators, the valves can be regulated electrically either through top-mounted solenoids or by direct air pressure.

Initial designs include three-way diversion valves in 1½- and 2-in. sizes, and two-way valves in the same sizes. The latter can be supplied to handle either the straight-through or the 90 deg. flow.

Valve bodies are fabricated by adapting standard sanitary (dairy type) fittings. Disks, seats, stems, and other parts in contact with the product, are of stainless steel, meeting accepted sanitary practices. All valves may be quickly disassembled for easy cleaning. Pneumatic actuators are housed in smooth, stainless steel housings, that have provisions for direct mounting of solenoids.

Also of advanced design is a new precision control valve for dairy product flow. Featuring a micrometer scale for extremely accurate positioning, this unit has a stainless steel parabolic plug for best control characteristics. Development was for highest accuracy in regulating liquids through sanitary pipelines—*Food Equipment & Specialties Co., Wilmette, Ill.*

Circle 121A on Reader Service Card

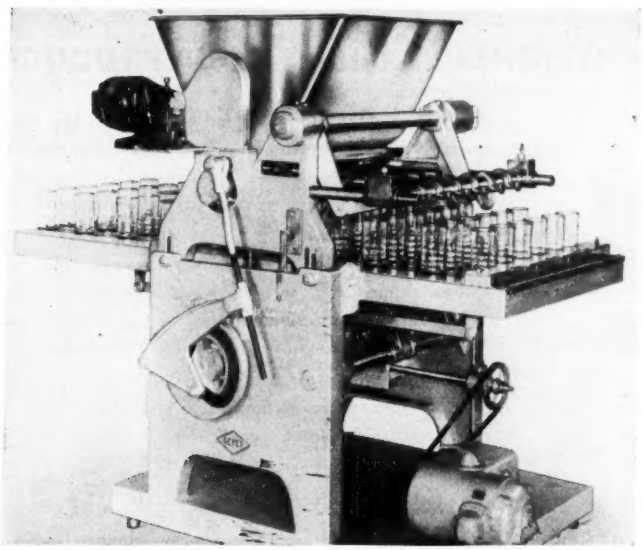
Heat-Molded Packings Give Extensive Wear

Recently announced is a precision-formed packing, of a special fabric and Neoprene compound, claimed to be resistant to a wide variety of hydraulic fluids.

Compression-molded under heat and high pressure, these "Periflex" packings are said to be superior in hydraulic and pneumatic cylinders, pumps, valves, etc., as static seals or in transverse action applications. Designs available include Cup, Flange, "U" Ring, and "O" Ring.—*Periflex, Inc., Hazel Park, Mich.*

Circle 121C on Reader Service Card

Jelly Filler Has High Capacity



This six-line jelly and preserve filling machine has a production capacity of 120 jars per min. Jar sizes handled range from 5 oz. to No. 10 tins.

Stainless steel has been employed for all product contact parts. A walking-beam type conveyor, incorporated in the machine, carries the jars and eliminates need for spacing bars.

Unit is reported to meet and pass all state and local sanitary food requirements.—*The Filler Machine Co., Inc., 1246-54 E. Montgomery Ave., Philadelphia 25.*

Circle 121B on Reader Service Card

New Solenoid Housing Is Explosion-Proof

Recently announced is a new explosion-proof solenoid housing for use on electrically operated pilot-controlled valves.

The cover, which can be used wherever fire and explosion hazards exist, is manufactured of cast-aluminum to Underwriters' Laboratory specifications, Class I, Group D, Air Break Type.

Provision is made for standard conduit connection. The explosion-proof solenoid cover may be used with ¼-in. to 1¼-in. size pilot operated straight-way, three-way, four-way, and four-way five-port models for single solenoid operation.—*Ross Operating Valve Co., 120 East Golden Gate, Detroit 3.*

Circle 121D on Reader Service Card

Hy-Tra-Lec WEIGHERS "Baby" YOUR PRODUCT

Hy-Tra-Lec weighs and fills your product into any type container with the gentleness of a mother's care. Breakage and crumbling are held to a minimum. Your product reaches the consumer at its attractive, delicious best.

The gentleness is all the more amazing in view of the superior weighing accuracy you get with Hy-Tra-Lec. Unlike conventional weighing machines, Hy-Tra-Lec uses neither spring nor beam scales. The secret rests with an exclusive, patented use of "positive displacement".

Products now handled in hundreds of plants throughout the world include cookies, crackers, potato chips, pretzels, marshmallows, gum and hard candies, and a variety of foods.

Special Service To You

Send us ample supply of product and package. We will conduct trial runs and report to you on the speed and accuracy you may expect with a Hy-Tra-Lec weigher. Models are available for both semi-automatic operation where bags are used or for completely automatic lines where rigid containers are used.

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EUROPE: SPERRY GYROSCOPE COMPANY, LTD., LONDON

Continuous Sardine Cooker Ups Yield and Quality

Advantages reported in processing with use of the new IMC-430 continuous sardine cooker are minimized labor, increased product yield, saving of covering oil, and low maintenance.

Further, quality of the sardine pack is stated to be equal to, or higher than, the standard French, Portuguese and Morocean pack.

Only two operators are required to run the unit—one at each end (feed and discharge). Cans are automatically brined, cooked, dried and oiled. Capacity of the cooker is 200 cans per min.

Maximum yield is attained, since practically all of the sardines are packed as first quality. Cans are closed hot immediately after cooking, consequently a high vacuum is produced. Oil content can be reduced 10 percent without affecting the general appearance of the canned product.

Since the cans are already sterile when leaving the cooker at a temperature of about 200 deg. F., the processing time can be reduced up to 20 percent.

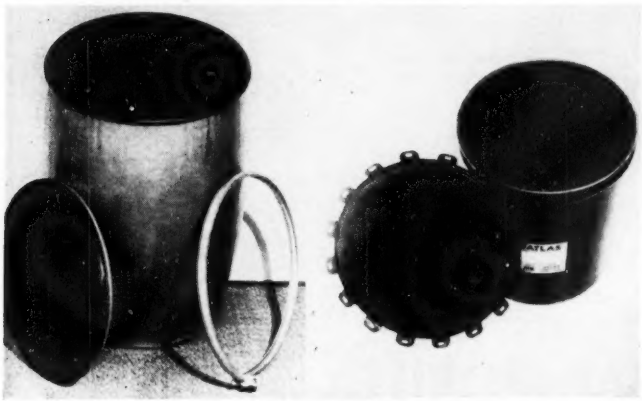
Maintenance is simplified because care of grids, racks, cooker, and dryers is reduced to mere care of the continuous cooker.

In operation of the machine, cans filled with sardines and brine are first located in position in the cooker then a wire screen or grid is placed over them. The following consecutive steps are then carried out automatically within the cooker: (1) Draining of first brine, (2) addition of second brine, (3) cooking with steam, (4) draining, (5) cooking and drying with hot air, (6) draining, (7) addition of hot covering liquid (oil, brine, or sauce), (8) heating with steam, (9) discharging processed cans of sardines, and (10) automatic cleaning of chain.

Overall dimension of the cooker: Length 50 ft. 2 in., width 9 ft. 8 in., height 10 ft. 2 in.—*Food Machinery & Chemical Corp., Hoopeston, Ill.*

Circle 123A on Reader Service Card

Washable Drums, Pails Have Polyethylene Lining



Materials ranging from edible foods to corrosive acids and alkalis are now being shipped in new and reconditioned steel drums, pails and hackney-type drums coated with Bakelite polyethylene.

This interior coating resists moisture and most chemicals at ordinary temperatures. Flexible and tough over a wide temperature range, the continuous coating adheres strongly to the steel container when applied and maintains this adhesion continuity under rough shipping conditions.

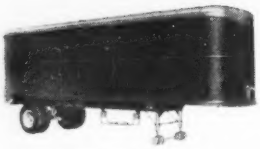
Lining application method has eliminated chime of container, so packaged products contact only the relatively inert polyethylene, never the metal.

Merely washing out inside reconditions coated containers. They can be re-used many times. Some substances reported successfully shipped in coated containers include detergents; sodium hypochlorite; nitric, hydrofluoric, sulfuric, phosphoric, hydrofluosilicic, and fatty acids; also many other edible and non-edible products. Tested with copper sulfate and muriatic acid, the coating, according to maker, showed no trace of copper deposits after 168 hr.

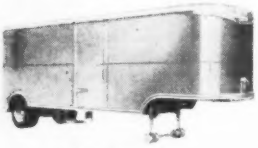
A bung-type open-head drum, completely coated inside, and with two coated bungs, is also available. Containers are offered in sizes 5 to 55 gal. —*Delaware Barrel Co., Inc., P. O. Box 1648, Wilmington, Del.*

Circle 123B on Reader Service Card

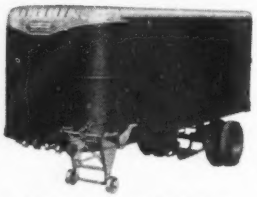
TRAILMOBILE BUILDS A FULL LINE
—Has the Right Trailer for the Job



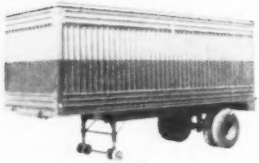
All Steel Dry Freight Van



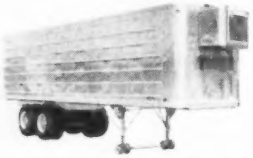
Drop Frame Van



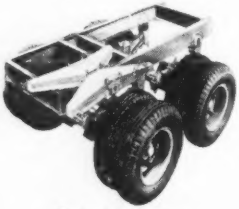
Complete Automatic Coupler Van



Corrugated City Delivery Van



Aluminum Refrigerator Van

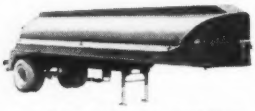


Trailmobile Tandem—
Only two Moving Parts

It takes a wide variety and many types of trailer to satisfy the specialized needs of the Trucking Industry.

Trailmobile builds a full line of trailers, designed to earn a profit for the operator—with a minimum of service. Pictured here are a few of the models and types available for prompt delivery.

Without obligation—call the convenient, friendly Trailmobile branch near you for recommendation or assistance on any hauling problem. These men are dedicated to your service.

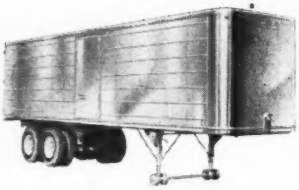


Tank Trailers for Liquids of All Kinds

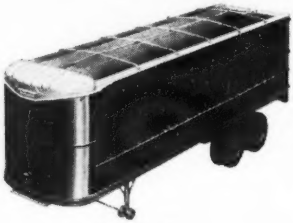
Bulk Cement Trailer

Platform Trailer

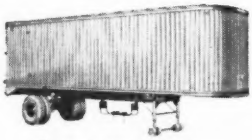
Four-Wheel Platform Trailer



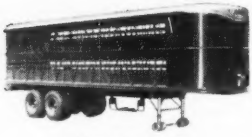
Aluminum Dry Freight Van



Open Top Van



Corrugated Dry Freight Van



Deluxe Cattle Rack

Lightweight Grain Rack

Drop-Frame Interchangeable
Chassis for Special Body Types

Friendly dependable Service from Coast to Coast

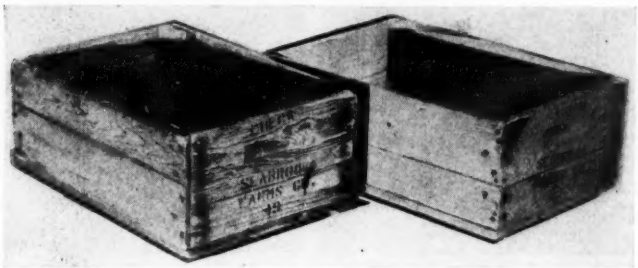
THE TREND IS TO

TRAILMOBILE

TRAILMOBILE INC.

CINCINNATI 9, OHIO
BERKELEY 2, CALIF.

Wood Preservative Extends Life of Crates, Pallets



Longer life is reported for wooden field crates, picking boxes, baskets, beverage cases, and industrial pallets through their treatment with a new preservative called Cellu-san.

Material can be easily applied by dip, spray, or brush. Tests have shown that it is safe to handle, causing no irritation of the skin. It is available as a liquid concentrate and can be diluted at the time and site of treating.

Following intensive field tests by representative firms in various sections of the country, it has now been released nationally. Material is stated to successfully control mold and mildew through its fungicidal properties, to leave no residual odor, and to reduce swelling, warping, and shrinking because of its water repellency. Tests have shown that it also improves the wood's nail-holding power and preserves the wood resiliency that enables boxes to withstand rough handling. In above illustration, treated box is at right.

According to company officials, material was especially engineered to fill a need expressed by the National Wooden Box Assn. for an effective wood preservative that would increase box longevity and at the same time be safe, odorless, and impart no unpleasant flavor.

In addition to its special protective and strengthening characteristics, material is reported to help stabilize the tare weight of the containers through controlling moisture absorption of the wood. Processors who buy crops on a pound basis are thus protected against extra costs resulting from moisture weight pickup by containers during wet, humid weather.—***Fungitrol Chemicals, Inc., Hillside, N. J.***

Circle 125A on Reader Service Card

Power Bucket Accessory Speeds Bulk Handling

Faster, easier, handling of bulk materials is reported when Hi-Duty lift trucks are equipped with the new "Power Bucket" accessory.

Bucket has a capacity of 9 cu. ft. (⅓ cu. yd.). Constructed of hi-tensile steel with a special plow steel lip, it features flared sides and lip to facilitate clean-up along walls and into corners.

Action of bucket is controlled by hydraulically actuated cylinders, thus eliminating "shock dumping". The bucket can be opened or closed through full 90 deg. arc at any desired height up to 7 ft., 10 in. on a 9 ft. mast. This height will permit over-the-side loading of dump trucks.

Bucket can be removed and replaced with lift forks in a matter of minutes for the handling of other materials.

At present, this accessory is available only as original equipment on new Hi-Duty trucks.—*Transitier Truck Co., Portland, Ore.*

Circle 125B on Reader Service Card

Improved Separator Used In Hump Assemblies

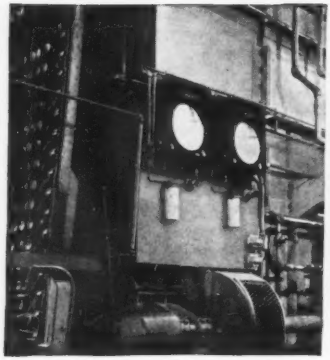
Newly improved permanent magnetic separators, called ATOMagnets, are now installed in a line of gravity flow hump assemblies that can be easily placed in service.

The magnetic hump is put in vertically to remove tramp iron from heavy loose-flowing materials conveyed in downspouts. Baffles in the assembly direct material flow 30 deg. from the normal straight line so that non-electric separators, installed on opposite faces of the hump, are in tandem as a magnetic barrier to halt any metallic particles.

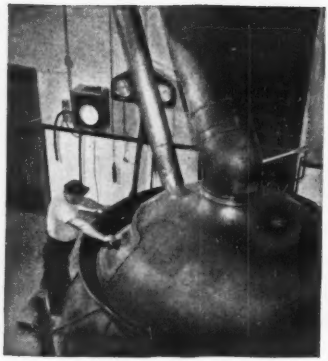
"ATOMagnets" are improved permanent magnetic separators incorporating several new features. Among these are fully riveted construction for increased rigidity, continuous hinge of non-magnetic aluminum for ease of cleaning and for longer service, and formed aluminum cover to prevent accumulation of iron on backs of castings and consequent loss of magnetic strength.

Stocked in sizes from 4-in. to 40-in. chute widths, humps may be built larger for special applications. Adaptors for round or rectangular openings are available.—*Eriez Manufacturing Co., Erie, Pa.*

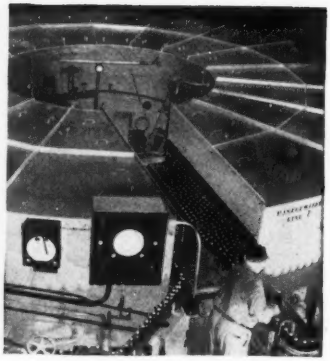
Circle 125C on Reader Service Card



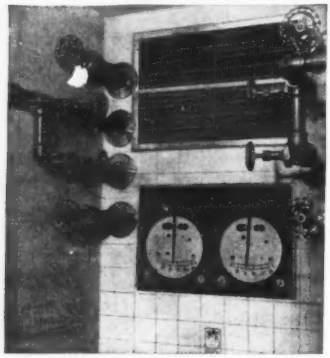
PASTEURIZING CONTROLLED
at Gunther's, Baltimore, Md.



BOILING CONTROLLED
at Fuhrman and Schmidt, Shamokin, Pa.



PASTEURIZING CONTROLLED
at Schmidt's of Philadelphia



FERMENTING CONTROLLED
at Hamm Brewing, Minneapolis, St. Paul, Minn.

SUPERVISION CENTRALIZED
at Blitz-Weinhard, Portland, Ore.

These Brewers Know...

BROWN INSTRUMENTS are helping to close the gap between the craftsmanship of the brewing art and the advanced techniques of modern high-production processing.

These brewers are among the large number who have found that measuring, recording and controlling instruments help them to *know exactly* what goes into their products and what goes on in their processing equipment. From water treatment to carbonation and bottling . . . instruments eliminate variations, do away with human errors, and provide a complete history of every brew.

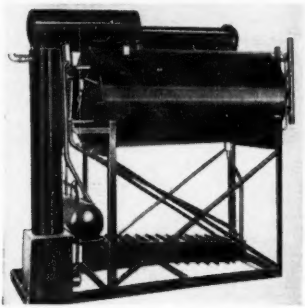
These brewers know that Honeywell brings process information right to the master brewer's office . . . by means of daily record charts and by electronic instrumentation that lets him measure temperatures throughout the plant without taking a step. *These brewers know* how to take advantage of Honeywell's broad experience in process control . . . to brew better, more uniform beer and ale.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 4502 Wayne Ave., Philadelphia 44, Pa.

FREE OFFER: *Write for a copy of authoritative article, "Instruments Take Hold In Brewing."*

MINNEAPOLIS
Honeywell
Brown Instruments

Refrigerating Equipment Operates on Waste Steam



Proper temperature and humidity control are reported provided for food manufacturing processes at minimum operating cost with employment of this new refrigeration unit. An absorption-type water chiller with a capacity of 20 tons or more, it can be run on waste heat or waste steam.

Nominal refrigeration capacity rating is 20 tons when it supplies chilled water at 45 deg. F. and uses 360 lb. of steam per hour and condensing water at a temperature of 85 deg. By employing condensing water at temperatures below 85 deg. or by supplying more steam, capacity will exceed 20 tons.

Purpose of unit is to deliver refrigeration in form of chilled water, which is piped to separate air conditioner units, containing filters, coil and fan. For winter operation, hot water may be supplied through the same piping system. Where waste heat or waste steam is available, cost of operation for food processing can be brought very low.

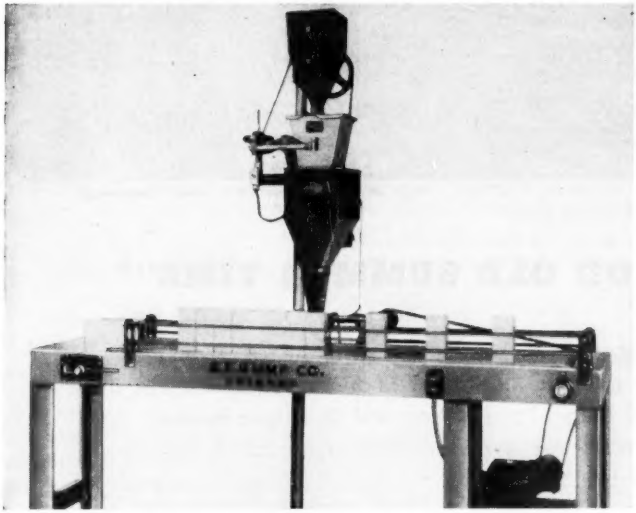
This water chiller is exceptionally compact. It is 30 in. wide, less than 8 ft. long, occupies 19 sq. ft. of floor area. Unit does not require any vibration dampening or noise insulation, since it utilizes the gas absorption principle and operates without moving parts.

Company will furnish refrigeration "core", leaving choice of water circulating pumps, heat exchange surfaces, blowers, filters, steam controls and cooling towers to customer's engineer.

Units are heremetically sealed and capacity tested at factory. No field assembly is required for the equipment —*Servel Inc., Evansville, Ind.*

Circle 127A on Reader Service Card

Conveying-Timing Unit Handles Cartons, Cans, Jars



Synchronized with an automatic net weigher, a new conveying and timing device makes the operation of filling and moving containers to the closing station completely automatic. It does away with need for an operator at the filling station—an attendant is required only to place the empty containers on the conveyer belt.

Unit carries containers, cartons, cans or jars to the net weigher and automatically synchronizes movement of containers away from this station with the operation of weigher. Thus, filling speed can be maintained consistently and steadily at maximum capacity.

In operation, containers are either placed on belt conveyor by hand or fed from a supply conveyor. The first empty container is automatically moved up to, and held under the discharge spout of weigher, while rest of line is held back at spacing station. When weighed amount of material has been filled, container is released and moves on to closing station. Second empty container is then brought to a stop under weigher, to catch next discharge, and cycle is repeated.

The automatic timing mechanism (that synchronizes the movement of the containers with the operation of the weigher) is a standard unit designed to work with an Edtbauer-Duplex Automatic Net Weigher.

New unit is ruggedly constructed and equipped with container stop and hold devices suitable for the specific type of container used. It is powered by an individual fractional-horsepower gearhead motor.

For a complete installation, a steel or wood table with built-in belt conveyor and adjustable guide rails is furnished. This equipment is custom built for the individual installation. The automatic timing mechanism is mounted at rear of table under weigher. Pushbutton switches for both conveyor drive and synchronizing drive are conveniently located on front side of table. Conveyor pulleys, take-up bearings, and motorized gear reduction unit are mounted underneath.

Since installations complete with table are custom built, specifications vary with installation. In general, minimum floor space required is 24-in.x60-in., and table height is 33-in.

Conveyor motor is ¼ hp.; synchronizer motor is 1/20 hp.—*B. F. Gump Co.*, 1325 *So. Cicero Ave., Chicago* 50.

Circle 127B on Reader Service Card

AN ORIGINAL LITHOGRAPH BY HENRY E. WINZENRIED

"IN THE GOOD OLD SUMMER TIME"*

Summer brings a change of scene . . . kids racing out to the ice cream man . . . clamoring for sweets from morning 'til night. It is an old familiar scene, and behind it lie many special Riegel Papers. You will find them hard at work protecting the freshness and flavor of ice cream, candy, cookies, cake, gum, potato chips, popcorn, soft drink powders and many other good things to eat.

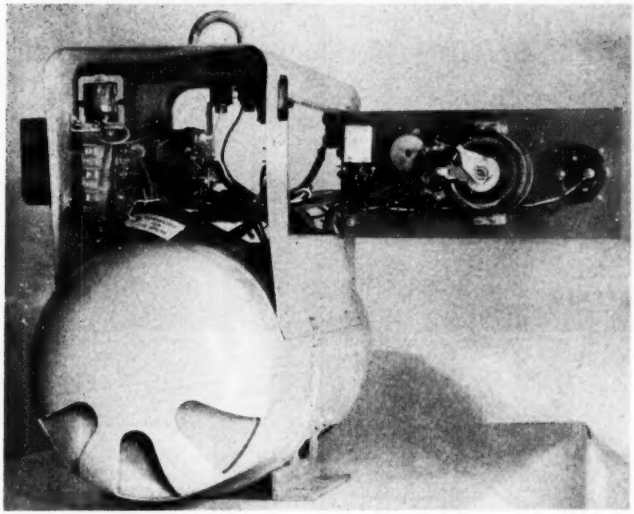
Literally hundreds of Riegel papers, for almost any kind of protective packaging, are now serving the sales leaders in many different fields. We are constantly developing even more varieties, in spite of present conditions, for companies who join us now in planning for the future. Write for information.

Riegel Paper Corporation • 342 Madison Avenue, New York 17, N. Y.

*Permission Granted by Edward B. Marks Music Corporation

Riegel **TAILOR-MADE PAPERS FOR PROTECTIVE PACKAGING**

New Battery-Charger Is Highly Versatile



This new battery-charger has a broad diversity of application for driver-ride industrial-truck batteries. It can be adjusted to deliver the proper charging cycle for any truck battery. Complete instructions for adjusting to battery-size and type are attached to the unit.

Versatile equipment permits complete freedom of choice of trucks and batteries. New charger has more than 2,000 readily selected charging-cycle characteristics built into it. It meets the charging requirements of the battery manufacturers for maximum battery life and output.

Charger is reported fully automatic and easy to operate. When unit has been adjusted for particular battery, operator just plugs it in, sets timer, and automatic control does the rest. Maker says there are no new charging details to learn. When battery is fully charged, unit shuts down automatically.

Correctly tapered charging is accomplished without series resistors. When heavy transportation schedules make booster charges necessary, the charger may be set for manual operation.

There are such safety features as protection against plugging in a battery with the wrong polarity and against overloading in both motor and generator. A reverse-current relay prevents discharge of the battery through the generator. The self-excited generator provides stability. In addition, it is impossible to attach a charging plug to live contacts.

Termed easy to install and readily made portable, equipment is lightweight and compact. Charger can be mounted on balconies or any kind of supporting surface. A lifting eye is included on top of the charger for ease in mounting.

Unit is designed for long life and easy serviceing, with sturdy construction to assure good service under heavy-duty operating conditions.

Control cabinet has a door in front and removable end covers to make control components accessible. The motor-generator set likewise can be maintained easily by removing the two end-covers to expose bearings, brushes, and commutator.—*General Electric, Schenectady, N. Y.*

Circle 129A on Reader Service Card

Stainless Steel Fittings for Vari-Size Tubes

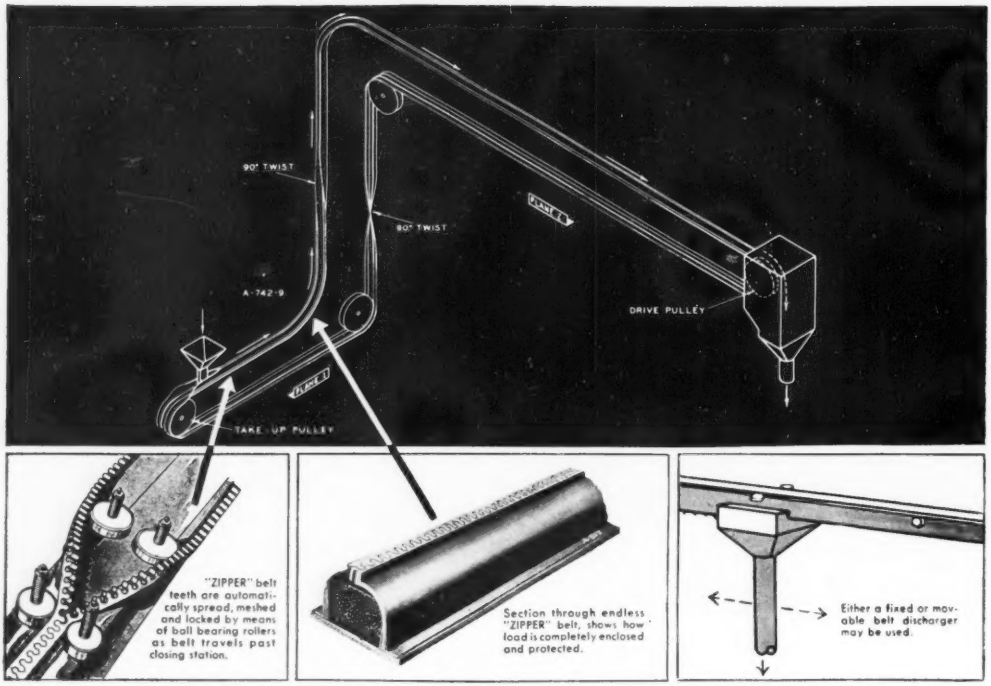
To meet unusual piping conditions, a complete new series of stainless steel tube fittings has been recently announced.

The new couplings come in any combination through 1 in. They permit different sizes of tubing, or tube-pipe combinations, to be joined in a single fitting. This feature eliminates need for supplementary reducing couplings at which line leaks might occur. In addition, installation costs are stated to be held to a minimum because one fitting does the work of two or three.

Illustrated is a tee equipped with a 1 in. tube, a 1 in. female pipe, and a $\frac{3}{4}$ in. male pipe connection.

New stainless steel connectors, unions, tees and elbows incorporate the patented, automatically-self-centering seat designed to provide a perfect wedge-type seal, even when tube is assembled off center. Another feature is the reinforcing Teflon rings for double-sealing the seat to further guard against losses.—*The Special Screw Products Co., 5445 Dunham Road, Bedford, Ohio.*

Circle 129B on Reader Service Card


90° TWIST
90° TWIST
A-742-9
DRIVE PULLEY
TAKE-UP PULLEY
"ZIPPER" belt teeth are automatically spread, meshed and locked by means of ball bearing rollers as belt travels past closing station.
Section through endless "ZIPPER" belt, shows how load is completely enclosed and protected.
Either a fixed or movable belt discharger may be used.

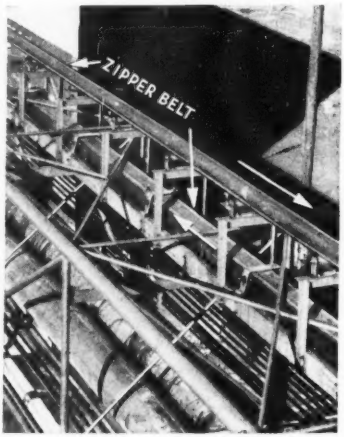
IN A CLASS BY ITSELF for Conveying Food Materials —ZIPPER closed-belt Conveyor-Elevator

"ZIPPER"—the unique conveyor-elevator developed by S-A engineers does the work of several conventional conveyors and elevators. But, with its one continuous rubber belt, the "Zipper" conveyor does the same work in less space—with elimination of extra drives, transfer spouts, casing, breakage and dust.

"Zipper" conveys horizontally, vertically or on an incline—in any direction and in any plane. Sidewall belts are closed around the load to eliminate spillage and escape of dust as well as contamination from the outside. "Zipper" belt moves around obstructions—carries its load gently without breakage or segregation.

Belt opens for complete discharge and cleaning when necessary. Speeds may be regulated up to 200 FPM to give practically any capacity. Pulverized, granular, lumps or flaky materials are particularly suited to "Zipper" application. This system is not only "flexible" in operation but also in its adaptability to many applications—probably including some problem of yours.

Invite S-A engineers to recommend how new "Zipper" Belt Conveyors can serve you. There's no obligation—so, write today!

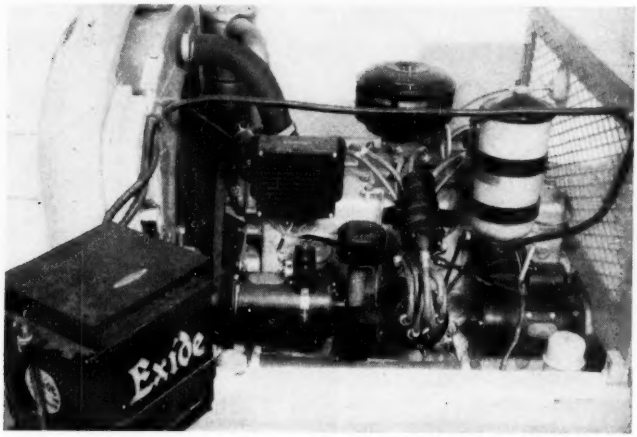


TYPICAL INSTALLATION
Belt makes a complete circuit over pulleys and rollers as it passes across an open areaway. Materials, sealed in totally-enclosed belt, are discharged free from contamination.

1901-1951
50 years experience with bulk handling
STEPHEN S-A ADAMSON MFG. CO.
6 Ridgeway Avenue, Aurora, Illinois · Los Angeles, Calif. · Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

Spark-Shielded Fork Trucks for Hazardous Areas



To provide maximum possible safety operation in gaseous and dust-laden areas, anti-spark, gasoline fork truck models have been designed.

Protection has been accomplished by shielding the electrical equipment. Moreover, there are provided a water-type exhaust manifold, a water-cooled muffler, and static-conductive tires. Trucks so equipped will not readily cause ignition of any vapor via sparks, hot surfaces, or backfires.

Details of the trucks are as follows:

Fuel tank is of heavy welded steel construction, surrounded by strong structural members as protection against rupture. A special filler cap that seals automatically is shielded from the engine compartment so ov r-flow can't drop on electrical system of hot engine parts.

Fuel lines are of copper tubing, and gasoline filter bowl is all-metal. Lines are supported throughout, and they are so located that if they do leak, gasoline won't drop on hot surfaces.

An up-draft carburetor with a leak-tight metal air horn is connected directly to an air cleaner of the back-fire arrestor type. Exhaust manifold has a water jacket designed to keep exhaust system temperatures low.

Muffler is a water type that quenches sparks in exhaust by directing them against a water spray.

All low tension wires and cables are enclosed in flexible non-metallic tubing, with metal enclosures to receive wires and terminal connections. Wires and cables are securely held to prevent chafing due to vibration, and they are located with safe clearance from any moving parts, hot engine surfaces, exhaust and fuel system lines.

High tension wires are enclosed in flexible metal tubing that is grounded wherever wires pass through metal surfaces.

Spark plugs are enclosed to prevent possibility of sparking between terminals and plug bases due to moisture or dust.

Generator, starting motor, and relays are totally spark-shielded and have a cover over terminal posts to prevent accidental sparking from a tool or metal object. High tension coil, voltage regulator, and distributor are also totally shielded.

Battery terminals are protected by an insulated cover to prevent a short due to contact of metal tool or upsetting of battery. Instrument panel, including starter button, is enclosed. Horn is a standard spark-protected electric unit. Static conductive tires are used to prevent a spark discharge between truck and floor.—*The Yale & Towne Manufacturing Co.*, 1,000 *Roosevelt Blvd., Philadelphia* 15.

Circle 131A on Reader Service Card

New Tachometer Covers Wide Speed Range

A new three range, single head, fixed installation tachometer indicator is announced for applications where a particularly wide range of speed measurement is desired. New instrument, Series 42P can be used with any of the company's various tachometer heads.

Simple rotation of the indicator range knob instantly selects one of three ranges to gage any speed over a total range of 40 or 50 to 1, based on readings down to 1/10 full scale of the lowest range. The ranges are carefully chosen for ease in reading, and the scales are all a full 4-in. long with 100 divisions.

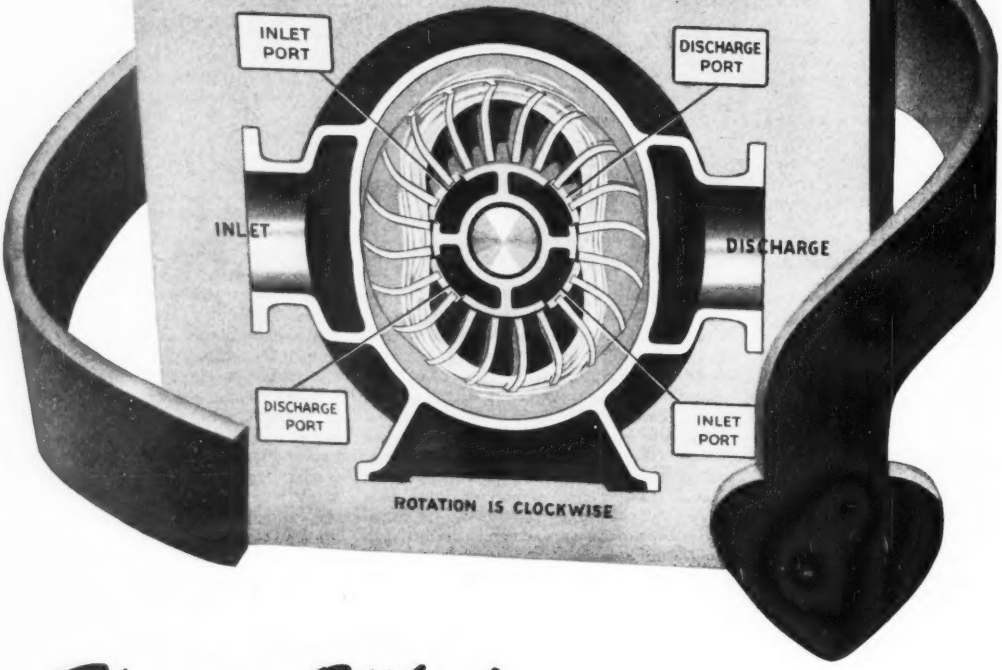
Indicator calibration is stable indefinitely and good over a wide temperature range. However, calibration is easily adjustable in the field. Scales are supplied for direct reading in any units, such as rpm., fpm., in./sec., or in any quantity proportional to the speed actuating the head. Various tachometer heads permit direct measurement ranges from speeds between ½ rpm. and 100,000 rpm. without requiring a speed change drive of any kind.

Indicating meter, of rugged design, is mounted in sponge rubber. With ordinary open wires, the indicator can be located up to 1,000 ft. from the head without materially affecting calibration.

Selection of unsuitable range or overspeeding does not damage indicator.—*Metron Instrument Co.*, 432 *Lincoln St., Denver* 9.

Circle 131B on Reader Service Card

Nash Instrument Air Compressors deliver only clean air, free from oil or dust, and without filters



Here is Why!

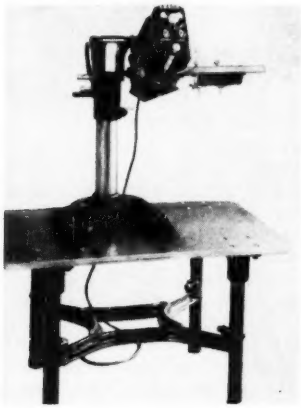
You can dispense with oil filters and dust filters when you install ®Nash® Clean Air Compressors. You can save the cost of maintaining these devices. You can greatly reduce instrument maintenance costs. For the Nash employs no internal lubrication, therefore no troublesome oil is in the delivered air. Moreover, air from a Nash is thoroughly washed and cooled as it passes thru the pump. Dust in the plant atmosphere, even fly ash, is immediately removed.

®Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

No oil filters.
No dust filters.
No internal lubrication to contaminate air handled.
No internal wearing parts.
No valves, pistons, or vanes.
Non-pulsating pressure.
Original performance constant over a long pump life.
Low maintenance cost.

NASH ENGINEERING COMPANY
376 WILSON, SO. NORWALK, CONN.

Rotary Bag-Sealer Meets Small-Job Requirements



Food processors with modest requirements are offered this rotary bag-sealing machine. It is a smaller version of the company's heavy-duty sealers, providing fully automatic control of pressure, time, and heat.

Heat is closely controlled with an adjustable thermostat. The sealing head is swivel-mounted and is instantly adjustable for sealing bags at any angle from vertical to horizontal. Height can be adjusted by setting the split-mounting bracket at any required position on the vertical shaft.

Feeding is from either right or left, simply accomplished by reversing motor direction. A fold-over blade handles folding bag tops. This can also be used as a top guide for straight sealing without floating, and for header label work.—*Amsco Packaging Machinery, Inc., 31-31 48th Ave., Long Island City, N. Y.*

Circle 133A on Reader Service Card

Beer Deposits Removed By Alkaline Cleaner

Faster, simpler cleaning operations in removing beer deposits from piping and fillers in breweries is reported with use of a fast wetting alkaline cleaner.

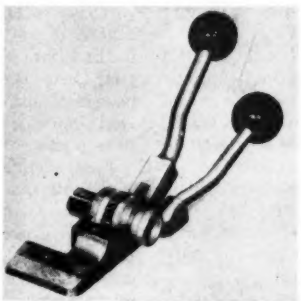
In many breweries inhibited acid is used to remove beer deposits. As a rule, the acid, diluted with about three parts water, is pumped through the lines at least once a week. Fillers had to be disconnected from the lines and soaked in the same acid solution.

With use of Magnus 1DX, dismantling of the fillers is stated no longer necessary.

In practice, 1 oz. per gal. solution of this fast wetting alkaline cleaner is pumped through the lines and fillers for about 2 min. to clear the lines. Then solution is left in entire system for 30 min. Lines are then opened and flushed with hot water for 5 min., and system is then ready for use.—*Magnus Chemical Co., Inc., South Ave., Garwood, N. J.*

Circle 133B on Reader Service Card

Strapping Tool Fits in Pocket



For pulling steel strapping tight around any size or shape object, engineers have developed this handy tool. It handles strapping of $\frac{3}{8}$, $\frac{1}{2}$, $\frac{5}{8}$ or $\frac{3}{4}$-in. size.

Puller is compact enough to slip into overalls pocket when not in use. Known as the No. 120 Steelbinder, it operates like the larger units, except that it does not cut off surplus strap as an intergral part of its binding action. Here, severing the surplus strap is performed as a separate operation with a cutter. Shortened handles adapt the unit to close-quarter work, as on ladders and scaffolding.

Unit achieves a tighter tie because it places no wedge between the strap and the object tied. This feature provides better control of binding operation.—*A. J. Gerrard & Co., 1950 Hawthorne Ave., Melrose Park, Ill.*

Circle 133C on Reader Service Card

Hand Chart "Spots" Relative Humidity

A unique humidity indicator called "Humigraph" is announced. It consists of a card measuring $6\frac{3}{4}$-in. x $1\frac{7}{8}$-in. with a vertical column of seven chemical color spots denoting relative humidity from 10 to 70 percent.

Changes in humidity cause the spots to turn color. The reading is made at the top blue spot.

Covering temperatures from 50 to 200 deg. F., the card will give dependable readings for many months. For small changes in humidity, it responds in about 10 min., and for a change of 40 percent, the response time is about 30 min.

This novel indicator can be used as an insert in long-term packaging of materials affected by humidity changes, or for "spot" checking of humidity without recourse to instruments or charts.—*Andrew Technical Service, 3805 N. Clark St., Chicago 13.*

Circle 133D on Reader Service Card

Double-Hook Hoist Rig Handles Long Items

For quantity handling of various long items, also lifting and dumping of heavy barrels or drums of powdered materials and liquids, a new double-hook hoisting unit is now offered.

Assembly is comprised of a complete hoisting unit with reversing motor, trolley, cable, and hooks.

Unit will fit any size tub for handling chips, waste, coal ashes, liquids or any loose material suitable to convey and dump for quick and simplified unloading.

Hoist lifts 500 lb. at 25 fpm. or 250 lb. at 50 fpm. Hooks are regularly spaced 48 in. apart, but can be adjusted for lesser distance. Unit can also be furnished with hooks set at a greater distance.

Hoist has swivel and adjustable trolley wheels to fit any size or make of track, and it will travel any size curve.—*Flinchbaugh Co., York, Pa.*

Circle 133E on Reader Service Card

In Behalf of Progress . . .

Your Country Needs the Steel Scrap in Your Plant

Steel producers are stepping up output at a rate that promises relief from severe shortages within a couple of years. But they need help from the men who manage factories—including each and every food processing plant. Every ton of open-hearth steel made calls for half a ton of scrap metal. And a large part of this scrap must come from worn-out or obsolete industrial equipment and from junk piles in factory storage rooms and yards.

Three million additional tons of scrap will be needed this year to take care of the increase in steel capacity. Still more must be had in 1952. For by the end of next year, steel production should reach an annual rate of 117,500,000 tons—up 20,800,000 tons over the record 1950 output.

The need for steel scrap is particularly serious now. Scrap inventories in eleven major steel companies recently declined from a 50-day backlog to one that is fluctuating from a few days' to a few weeks' supply. A safe working inventory is a 60-day supply.

Because of the urgency of the situation, National Production Authority has organized a campaign to seek out dormant scrap in factories and get it into the hands of scrap dealers quickly. And NPA asks management officials throughout industry to take steps immediately to collect random heavy scrap from their premises and to write off idle, obsolete machinery and equipment.

The management of each food plant should appoint a high-ranking individual, or a committee, to do two things: First, make an emergency inspection and inventory of all heavy steel items that can be sold to the local scrap dealer quickly. Second, establish a long-range clean-up operation involving the systematic junking of equipment as soon as it becomes obsolete.

Your cooperation obviously will help your country to meet defense production quotas and at the same time maintain civilian output at a level that will support the economy. But it also will yield these direct benefits to you: Help you to get more new equipment in the future by increasing the steel supply. Reduce your taxes through inventory write-off of obsolete machinery and equipment. Clear valuable floor space. And improve safety and sanitation conditions in your plant.

It is surprising how much metal one plant can contribute to the scrap pile. In the World War II scrap drive, one company turned in no less than 88 carloads of dormant steel in three months—and the firm was not a prime producer of scrap. This experience was so revealing and rewarding that the company set up a systematic procedure for removing equipment from inventory.

True, this firm was a large one, but your scrap contribution can be proportionately large.

Since you can help the country and also profit directly, why delay in putting scrap recovery on a business-like basis? Get rid of the "loafers" among your machines and dispose of unsightly junk heaps as soon as possible. And don't forget that an idle, useless building can be put to top-priority work if its steel is tossed into an openhearth furnace.

Federal Judges Don't Like Filth in Food

Federal seizures of unfit foods are so few in proportion to processed food production as to be of little concern in the overall. But the particular processor whose products are involved in a seizure has plenty to worry about. Financial loss through destruction of the food can be pretty tough. But worse, such seizure usually indicates lack of proper plant sanitation or quality control.

Surprisingly, 1950 records show that most of the unfit foods seized were made from filth-contaminated raw materials or did not receive adequate protection during storage. And for the few processors whose contaminated products bear witness to improper sanitation, Federal judges show little sympathy. Last year, three food plant managers were sentenced to jail for insanitary operations, and others received substantial fines.

After all, it is not expecting too much when government officials ask that food plants keep up with modern sanitary practices.

Some processors who do a good job of keeping plant and equipment clean slip up when it comes to sanitation of raw materials and containers. Not only is it essential to inspect materials and reject or reclaim that which is contaminated, but materials and containers must be stored and handled so as to preclude introduction of dirt, insects and rodent filth.

If you have no sanitarian who can insure cleanliness in plant, equipment, personnel, materials, and containers, you better do one of two things: Hire such a man. Or call in a consultant to set up proper procedures, and then have one of your men trained to successfully carry out those procedures.

Various schools and associations give courses in sanitation. Even a correspondence course is available. It pays to take advantage of such facilities.

TO GET THE RIGHT *Lightnin® Mixers*

MIXCO® Engineered

JUST USE THIS HANDY CHECK LIST

Every LIGHTNIN Mixer you buy is guaranteed to do the job for which it is recommended—or you get your money back.

To get a portable mixer that will do the job and stand up, here's all the data you need to send us:

- ✓ **Dimensions and shape of the tank.**
- ✓ **Ingredients being mixed.**
- ✓ **What you expect the mixer to accomplish, and in what length of time.**
- ✓ **Electric current voltage, cycle and phase (or air pressure, if you plan to use a LIGHTNIN Air Drive Mixer).**

Our application engineers will promptly recommend the right portable mixer for the job you have in mind. In every case MIXCO assumes full responsibility for the success of the installation.

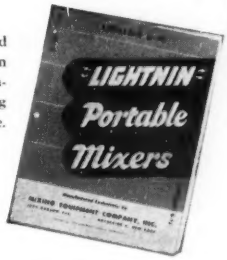
For more complex jobs, or where permanently mounted mixers are required, send for our helpful Mixing Operations Data Sheet. Just check the coupon below.

Lightnin® PORTABLE MIXERS

Electric motor driven, gear drive (shown) or direct drive—⅛ to 3 H.P. Also available with air motor, geared or direct drive types, from ⅛ to 1 H.P. Motors available for all characteristics. Smooth mixer lines permit easy sanitation. Ball and socket clamp provides famous LIGHTNIN double mixing action. Mixer can be rotated 360° horizontally and 90° vertically. Shafts and propellers are highest quality stainless steel. Standard propellers are accurately balanced for vibration-free operation. Easily adjustable on shaft or removable. For complete information, send for Catalog B-75.

PROCESS ADAPTED AGITATION
TOP-ENTERING
LIGHTNIN MIXCO
PORTABLES
SIDE-ENTERING

SEND FOR big 28-page illustrated catalog and 4-page supplement on portable mixers and their applications. Much of its data on mixing is available from no other source. Ask for Catalog B-75.



Complete Mixing Service for the Food Industries

FOR CLOSED TANKS—LIGHTNIN top entering propeller type agitators are available in electric motor driven construction from ¼ to 3 H.P., and in air motor driven type from ¼ to 1 H.P. Send for Catalog B-78.

FOR HEAVY DUTY MIXING—LIGHTNIN top entering agitators—turbine or paddle type. 16 interchangeable speeds in new heavy-duty drive. Sizes, 1 to 200 HP. Send for Catalog B-36.

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(MIXCO)

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- ☐ B-89 Top Entering Mixers (Turbine and Paddle Type)
- ☐ Mixing Operations Data Sheet

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TURN PAGE FOR FOLDOUT FLOWSHEET →

UNFOLD HERE

1 **MECHANIZED LINE** (rear) sections hogs, delivering parts to four trimming lines (belly line is seen, right.) Fat trimmings go by chute to floor below.

How All-Animal Shortening Is Processed

Improved Equipment Makes Quality Product With Long Shelf Life

FOUR STAGES—the last three of them continuous—are used by E. Kahn Sons Co., Cincinnati, in the processing of its quality all-animal shortening.

In the first stage, a batch operation, fat trimmings are rendered to lard; in the next, a portion of the lard is hydrogenated; then the shortening is blended and deodorized; and finally the product is finished and packaged.

Fat trimmings from the hog-cutting lines are delivered by gravity chutes to the fat pump—see Point (2) in the diagram—on the floor below the trimming room. These hunks of fat are then pumped to one of ten tanks for steam rendering. Resulting lard is held in cooling tanks until processed into shortening, except for a portion that is pumped to the hydrogenation plant.

Here, in the process of hydrogenating the fat, nickel catalyzer, suspended in lard, is proportioned from a mixing tank into the flow of lard going from the storage tanks to the deaerator. Safety measures require deaeration before hydrogenation to remove all air and moisture from the lard.

Lard and catalyzer, after deaeration, enter at the top of a mechanically agitated autoclave—Point (4)—where, at 150-lb. pressure and temperature of 300 deg. F., hydrogen in the presence of the catalyzer saturates the unstable fats. The hydrogen is admitted at the bottom of the autoclave.

Liquid hydrogenated fat flows continuously from the reactor, with the flow controlled by regulating valves. Filtering, which follows, is accomplished by use of the discharge pressure from the reactor. After filtering to remove the catalyzer, the hydrogenated product is either returned to the shortening plant or chilled on a rotary drum cooler—Point (6)—into hardened lard flakes. This stable flake-type lard, which requires no refrigeration, is weighed into bags to be marketed for use by other lard manufacturers.

Shortening is prepared by blending lard, hydrogenated fat, and edible beef fat, 15,000 lb. to the batch, in a steam-coil heated, mechanically agitated mixer. After blending, shortening is pumped to the deodorizer supply tank, where it is held at 140 deg. F.

Automatic controls regulate the intermittent filling of the deodorizing feed tank and its discharge of shortening into the deodorizer. The feed tank fill-and-discharge cycle, requiring 30 min., is also instrument controlled. Cyclic charge and discharge is 2,000 lb. of blend.

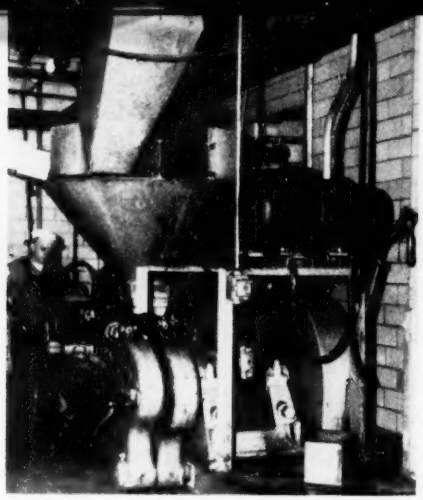
Purpose of the deodorizer—Point (7)—is to purify the shortening of its fatty acids and to remove all odors and odor producing volatiles. The purifying operation is conducted in five successive steps, each one in a tray or compartment inside the unit. Temperature of the blend is first raised to 375 deg. F. in the top compartment by steam coils. Then, through the use of a Dowtherm heating unit, the temperature is further raised in the next compartment to 475 deg. F.

The time cycle during which the shortening is in the deodorizer is 2½ hr. Throughout purification, the blended fats are under a vacuum of 6-8 mm. Live steam, injected into the shortening through perforated piping during the first four stages, agitates the fat in each compartment and also carries away odor producing volatiles.

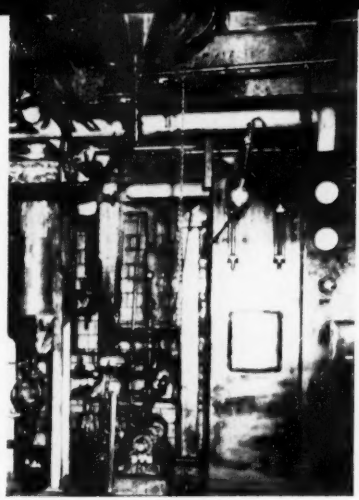
In the last step in the deodorizer, the shortening is cooled

Article Tells Story Behind Product

For more information and detailed description of process, controls, engineering and methods—see "Superior Animal Shortening" (special feature, p. 88).



2 **PUMP** that was designed for concrete delivers fat 200 ft. to lard-rendering tanks.

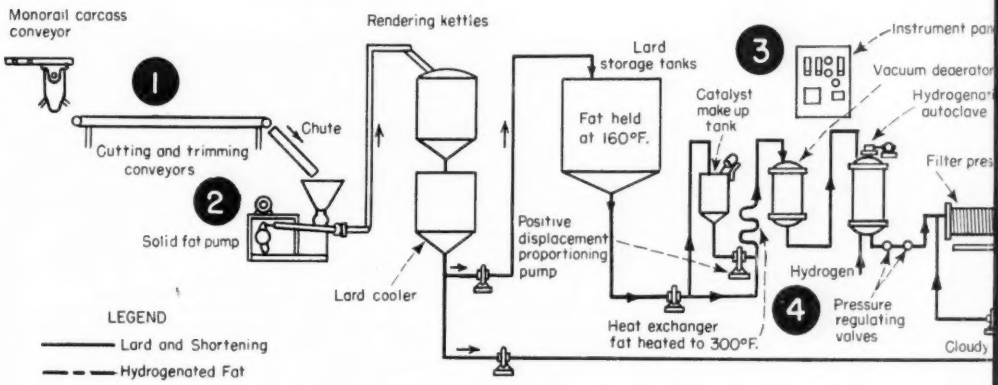


3 **FLOW,** pressure, temperature and vacuum instruments control hydrogenation.

4 **CATALYZER,** from deaerator

TRIMMING AND LARD RENDERING

HYDROGENATI



to 150 deg. F. by water coils. Every half hour the product in the cooling compartment is emptied into a drop tank. The every-30-min. transfer of shortening from one compartment to the next is automatically regulated by a Flex-O-Timer controlling motor valves on each compartment.

Final polishing of the product is accomplished in a closed-type pressure filter.

Anti-oxidant (8 oz. per 1,000 lb. of shortening) is added to the product to preserve its purity during shelf life. A concentrated preparation of shortening and antioxidant is mixed in a stainless steel kettle and injected by proportioning pump into the shortening as it leaves the polishing filter.

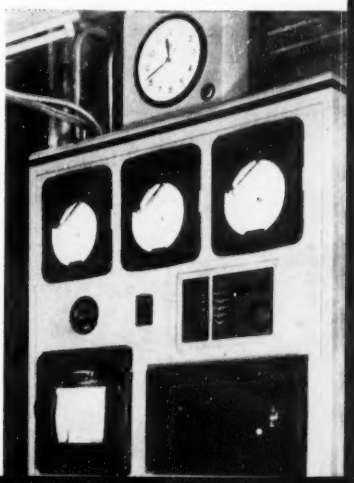
Before passing through the plasticizers, the shortening is cooled in Votator chilling units, where the heat exchange is effected by the direct expansion of ammonia. Plasticizing breaks up any crystal formations in the shortening and imparts to it a smooth, velvety texture.

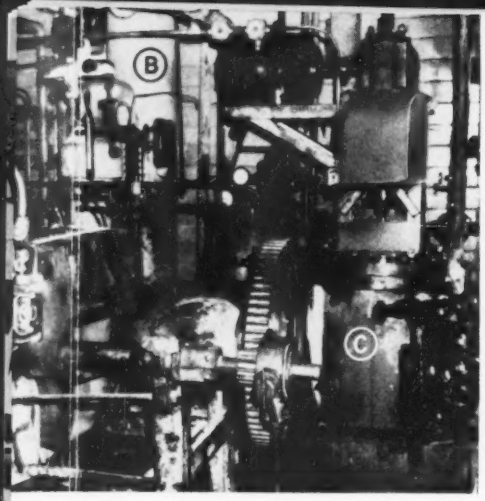
Packaging is in 1 and 3 lb. cans for the retail trade, and in 50 lb. cans and 400 lb. drums for industrial users.

Even without refrigeration, the finished product remains stable. It is odorless, and its shelf life is a year without deterioration. (Photo 7 and 9 by Girdler Corp.)

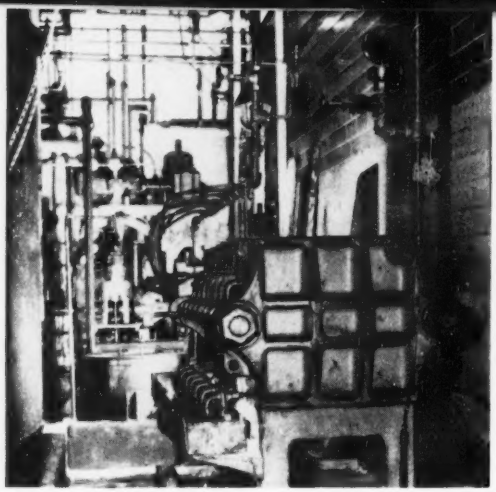
FE PICTURE-FLOWSHEET NO. 32

8 **INSTRUMENTS** record pressure, temp vacuum, also control time and rate



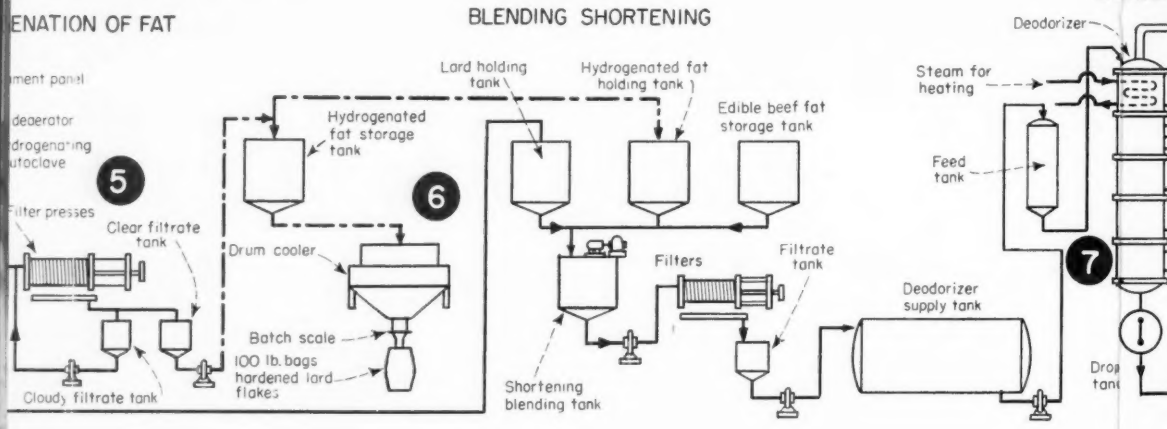


YZER, prepared in mixer (A), is proportioned into lard aerator (B) enroute to reactor (C).



5 PLATE-AND-FRAME filter, using pressure from the reactor, removes catalizer from lard.

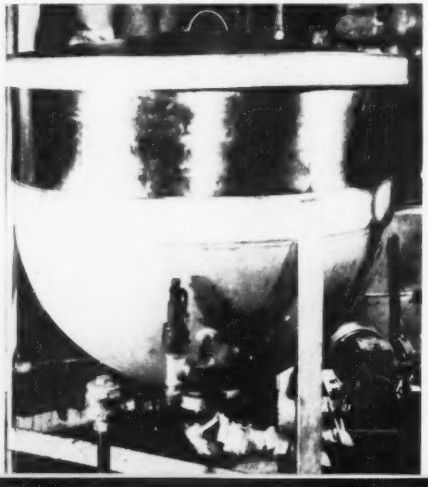
6 HYDROGENA (top) and ba

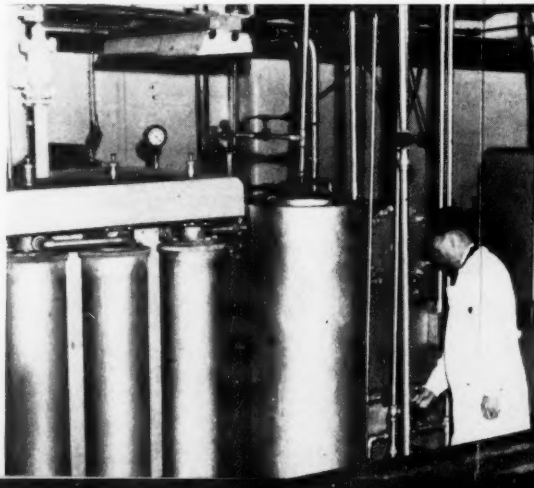


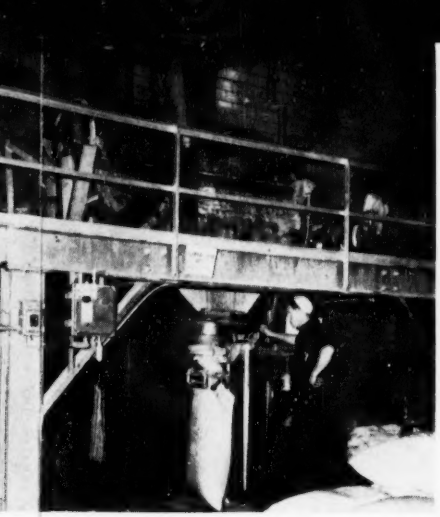
e, temperature, l rate of flow.

9 PROPORTIONING PUMP (right) continuously adds antioxidant to shortening.

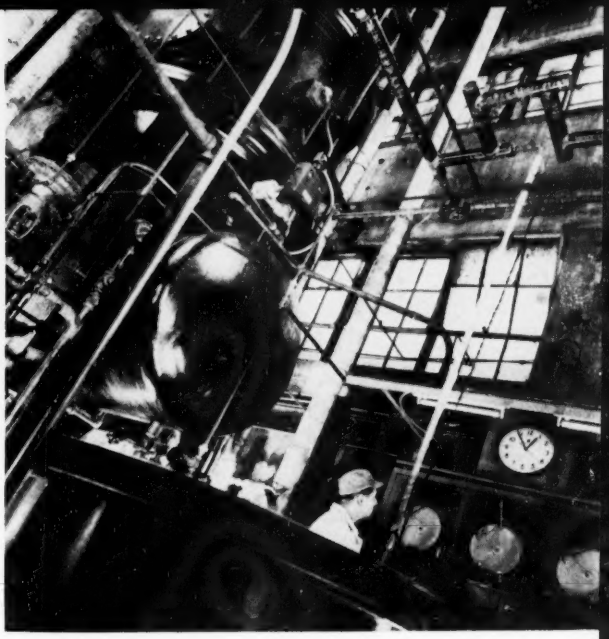
10 VELVET-SMOOTH texture is imparted to shortening by fi chilling unit (above), then plasticizing to break up crystal



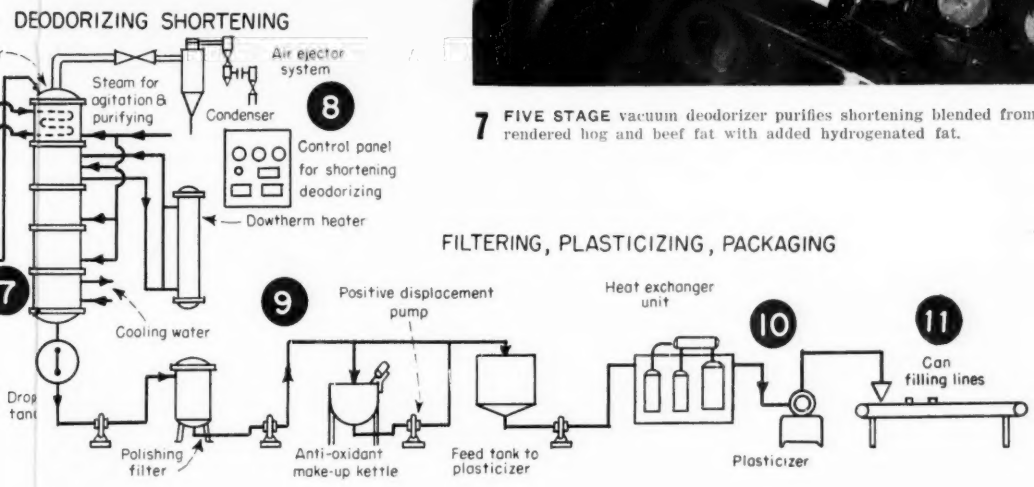




YDROGENATED lard is hardened on drum cooler op) and batch-weighed (100 lb.) into bags.

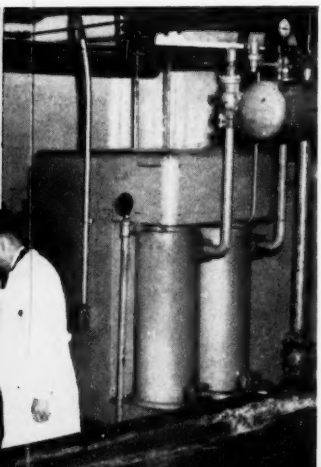


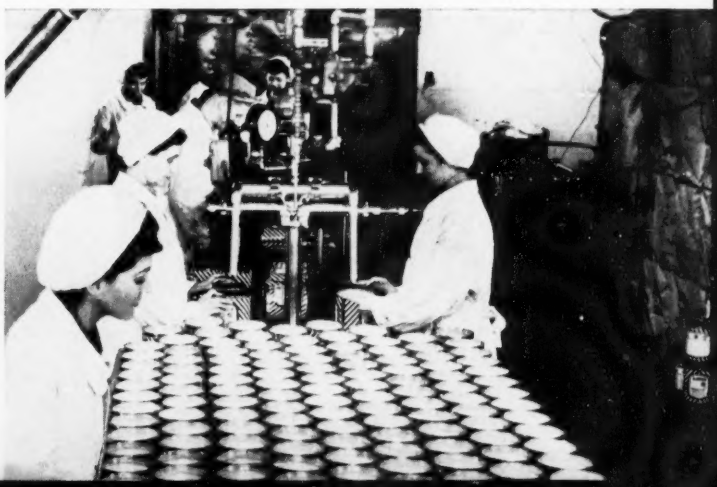
7 **FIVE STAGE** vacuum deodorizer purifies shortening blended from rendered hog and beef fat with added hydrogenated fat.



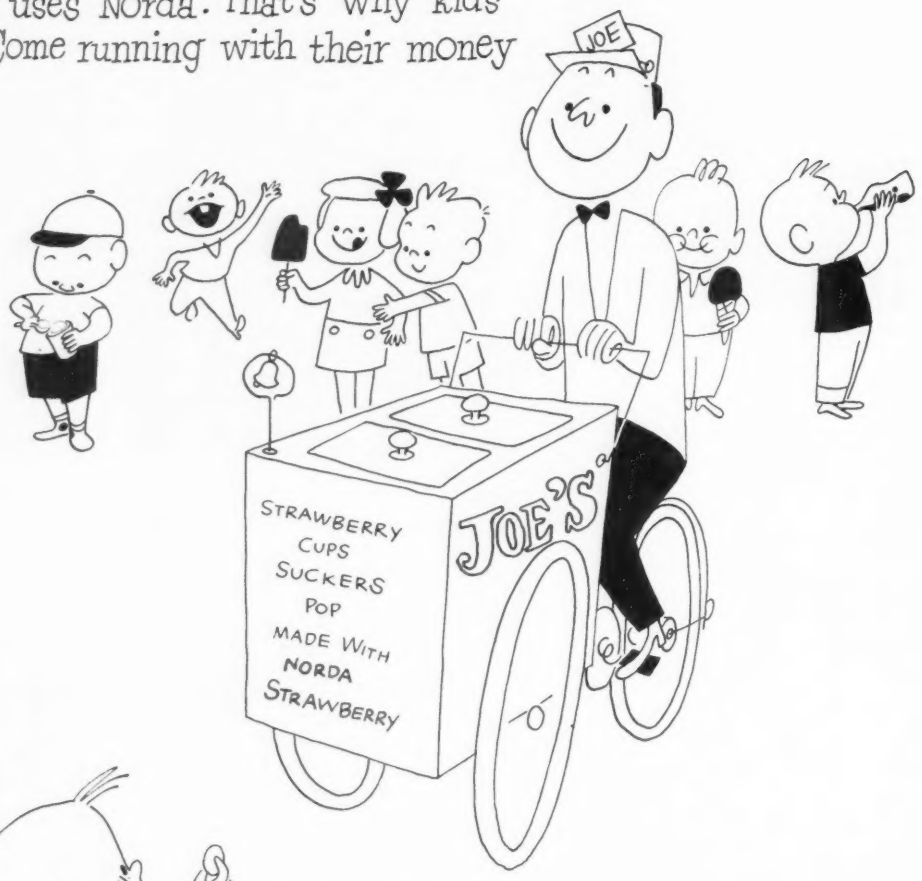
tening by first cooling in direct-expansion up crystal formation.

11 **PLASTICIZED PRODUCT** is filled directly into 3-lb. cans for retail users. Shortening is also packed in 1- and 50-lb. cans, 400-lb. plastic-lined drums.





NORDA STRAWBERRY ?... Ask Joe–
He'll tell you it's a honey;
He uses Norda. That's why kids
Come running with their money



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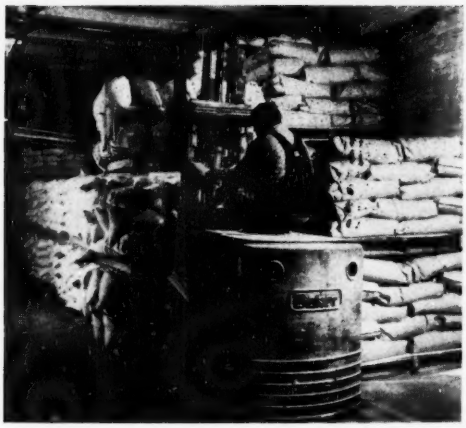
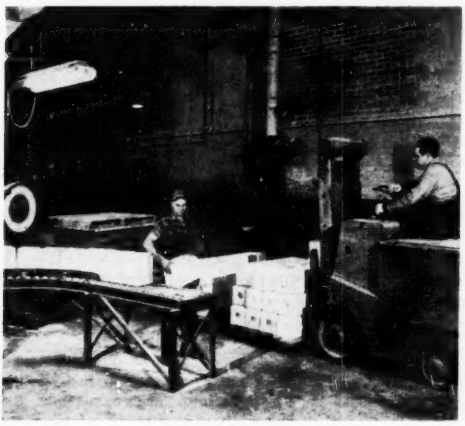


TIERING 100-lb. sacks three, and even four, high in warehouse is now regular procedure at Morton.



PALLETIZING a daily output of 2,000 blocks—of 50 lb. each, 46 to a pallet—solves another storage problem.

REDUCED handling is further aid. Note (right) 3-lane conveyor bringing cartons from packing department.

"Vertical Cure" Of Costly Clog

. . . jumps storage capacity 75% while benefitting both production and shipping through better handling and storing of finished products

H. S. SQUIBBS
Plant Manager, Morton Salt Co., Rittman, Ohio

By modernizing the practice of storing its finished products, Morton Salt Co., Rittman, Ohio, has removed an expensive bottleneck and greatly increased the handling of its operations.

The strain had become evident when production often had to be suspended for lack of storage "floor space." Despite the fact that there was a large two-building warehouse for the purpose, the floor area of over 110,000 sq. ft. had eventually proved inadequate. The reason: Advantage hadn't been taken of vertical storing methods that gained capacity by utilizing most of the storage area between floor and roof.

At that time, all of the finished products were handled on skids with low-lift platform trucks. Material scheduled for stock storage was delivered to the smaller section of the warehouse, where it was transferred to pallets and then tiered three-high by fork trucks.

Clogged With Outgoing Shipments

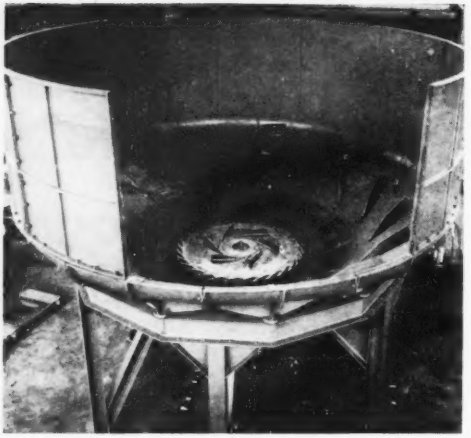
Material for shipment was brought to the order storage area located in the larger section, where these skid loads were left on the floor, ready for unloading into the outgoing carrier. At times, however, this area became choked with skids awaiting movement to box cars and highway trucks. Thus the halts in production—because absolutely no room was available for additional finished material.

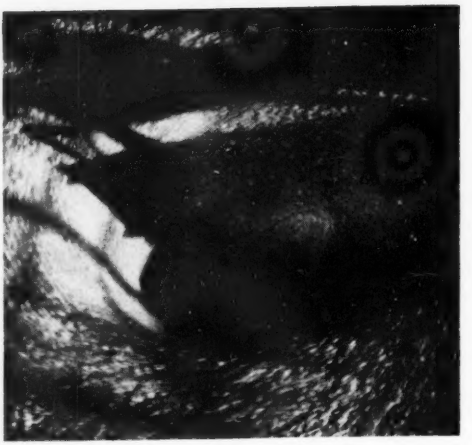
■ **But all this has now been remedied with installation of a pallet-fork truck system for the entire warehousing operation.**

The fork trucks—which replaced six of the seven low-lift platform trucks—now move, store, or load for shipment, the full 8-hr. output, so that the floor is always clear for the next day's production. Material is now handled on pallets which are tiered three and four-high by the fork trucks—thus vertically upping capacity 75 percent and stopping the hold-ups.

Still Other Advantages

Other benefits include: Elimination of the unnecessary handling formerly required in transferring, from skids to pallets, the loads scheduled for storage and, at time of shipment, the switch from pallets to skids; simplification of inventory control of material held in order storage; and also greater ease and efficiency in assembling and shipping customer's orders.





HYDRAPULPER, adapted from paper industry, is key machine in bagasse utilization process. At left is a closeup of unit, with two side panels removed to reveal rotor. Right: A pulping operation underway.

RESTYLING BYPRODUCTS

Will Add New Income

USDA shows sugar industry that it can get greater utilization of already useful bagasse and blackstrap by adopting newly developed method . . . Here's how

FE STAFF

Cane sugar milling and most other large-volume continuous-process food operations face a challenge—how to operate profitably in a period of rising costs?

The U. S. Dept. of Agriculture says that an answer to this pressing problem is—*better byproducts utilization*. And to illustrate its point, the Northern Regional Research Laboratory in Peoria, Ill., has come up with a process for what appears to be more profitable disposal of the two primary cane sugar byproducts—blackstrap molasses and bagasse.

The Department is presenting preliminary data on its studies in order to provide a guide to industry for the most profitable direction of research.

While this process has thus far been proved only on a laboratory pilot-plant scale, design and operation data are being obtained for a large pilot-plant installation at a sugar mill.

The process is essentially as follows:

1. Bagasse is separated into pith and fiber directly as it comes from the cane mill.

2. Pith is then dried and mixed with all blackstrap molasses. This is sold as one of the components of animal feed.

3. Pith-free fiber is dried, baled, and sold to paper mills.

Commercial execution of USDA's development will follow this same flow sequence, but will involve use of equipment suited to the grinding capacity of the sugar mill.

Process Details

Principal unit in the operation is the Hydrapulper (see photos). This machine, used in the paper industry for pulping waste papers or dried pulp, is a large, open tub equipped with a rotor in its bottom which induces violent agitation. Thus, the rapidly moving material forms a powerful vortex during treatment, and not only is the material repeatedly struck by vanes of the rotor and those on sides of the tub, but the fibers are caused to rub against each other. This loosens pith from the true fibers of the bagasse.

Initial step is to drag-convey bagasse from the mill to a storage bin that has the capacity of one Hydrapulper charge. From the bin this charge is dropped into the machine, then about 10 parts of cold water are added, and it is given a 30 min. treatment.

Next, the suspension is dropped into a suitable pit. At this point the operation becomes continuous. The suspension is moved to a rotary screen with a constant fresh water purge. Here, the bagasse fiber tends to float, while the pith flows through the openings in the screen.

Bagasse fiber from the rotary screen is now conveyed to a set of sugar roll mills which reduce moisture content below 55 percent. From there, fiber passes through a rotary dryer, where a final moisture content of 6 to 8 percent is established. A bailing press of dry fiber follows, with as dense a bale as possible being made.

Pith and water which have passed through the rotary screen are pumped over a finer sieve, where the mixture is thickened to about 5 percent solids. This passes from the screen through a dewatering press, where most of the water is taken out. Water from the pith thickener, press, and sugar rolls

is returned to the Hydrapulper or pulp chest for re-use.

The dried pith is then mixed with hot molasses and, if desired, protein supplement is added. The product is then pelleted and shipped by bags or in bulk. It is believed that standard pellets from equal parts of pith and molasses can be made in available commercial pelleting machinery.

Adds $1 Per Ton

The estimated cost and profits from this operation (based on assumptions that must be verified) indicate the possibility of additional profit to the sugar mill of as much as $1 per ton of cane ground.

Only a brief survey of the two by-products is needed to show why past usage could well be improved:

Bagasse is primarily used for fuel by most sugar mills. However, recent advances in sugar-house heat economy have resulted in a large surplus beyond steam generation needs. So the excess bagasse is usually burned, simply to dispose of it. A few mills convert to other uses, but from the overall standpoint the amounts utilized are negligible.

Blackstrap molasses, the second cane sugar byproduct in tonnage, has not enjoyed a stable market price for years. While much of it is used for feeding, its pricing has been based on the alcohol market. The sugar industry would like to tie blackstrap molasses prices in with the feed market.

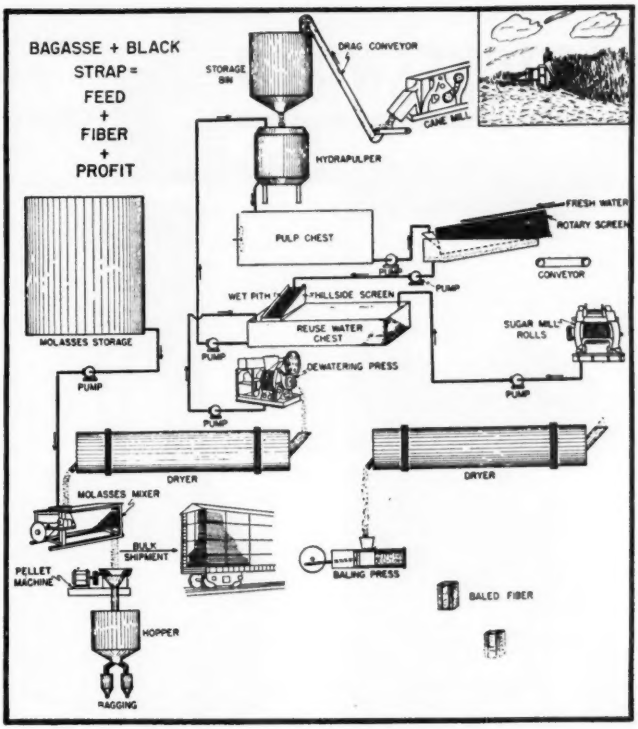
Actually, the new process was an offshoot of pulping studies that have been underway for several years at the Northern Regional Research Laboratory. Work on cereal straws for corrugated board and fine paper led to the discovery of a radically new, simple pulping process which produced higher yields at low operating costs. This was applied to bagasse only a year ago. And there resulted a de-pitched pulp with very attractive possibilities for fine paper making.

The new pulping method naturally led to a consideration of uses for the resulting pith. The logical conclusion was a joint utilization of this material with blackstrap molasses to produce a feed. Development of this part of the process followed rapidly.

Advantages to Industry

While whole bagasse produces good paper board, the de-pithed material gives a superior product. Furthermore de-pithing produces a pulp quality that is useful in high grade paper manufacture

And the serious pulp shortage developing is not the only factor assuring attractive market for this product. Compared with southern pine (one of the most widely used pulp materials) it has an estimated current value of about $13.50 per ton in bales at the sugar mill.



However, despite the market ability of de-pithed bagasse, its cost of production would be excessive if there were no profitable use for the pith. Clue here was the fact that pith mixed with molasses has already sold successfully as a feed in the U. S. and in several other countries. So the natural teaming of these two by-products appears to have very interesting and profitable possibilities in this country.

The chemical composition of pith is very similar to that of corncobs. Cobs have been shown to have about 66 percent of the nutritive value of corn in feeding steers. Information on the feeding value of pith is scarce, if any exists. However, on the assumption that pith has 60 percent of the nutritive value of corn, it would be worth $29.80 a dry ton with corn at $1.50 a bushel, or $19.85 a ton with corn at $1.00.

Couple this with the fact that the sugar mill wins its highest price for the molasses when it is sold for feed —at least ½ to 1c more a gallon. But the important advantage would be that the price of molasses would be stabilized by the feed market and not dependent, as it is now, on the alcohol market and its fluctuations.

In addition to the economic possibilities of this process, it offers operating advantages which should prove very attractive to the average cane sugar mill:

1. It would eliminate bagasse as a fuel, making for smoother boiler house operation (using oil or gas).
2. The loss in fiber from baling and storing wet bagasse would be eliminated, with about a 10 percent saving in pith and fiber.
3. Since all the blackstrap would be utilized as produced, there would be no necessity of further byproduct conversion after the grinding season.
4. A product for sale to manufacturers of mixed feeds would be available in easily handled, dry, dense form.

USDA is quick to point out that despite the apparent advantages of its process and its comprehensive pilot testing, the assumptions on which this "guide to research" is based must be verified. A good deal of practical field work lies ahead before the program can be fully realized in the cane sugar industry.

Photos in above article courtesy of Shartle Bros. Machine Co., Middletown, Ohio.

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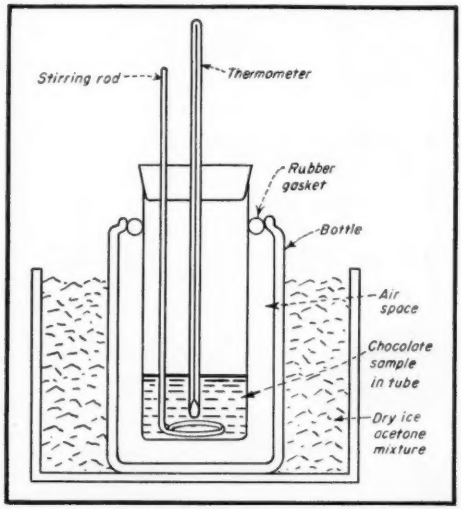
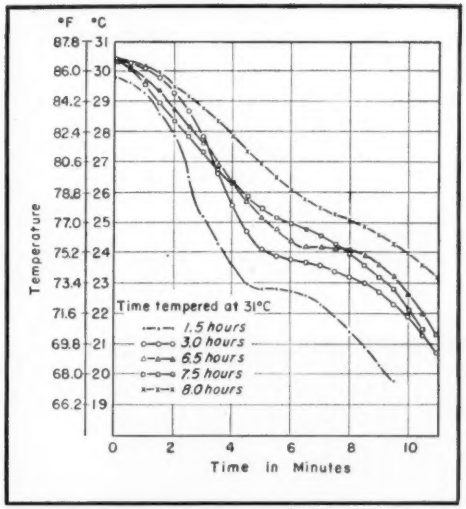
fmc *Subsidiary of Food Machinery and Chemical Corporation*

Simple lab set-up . . .



APPARATUS consists of sample tube, thermometer, stirring rod, bottle, and dry ice-acetone mixture for cooling.

. . . gives results in 11 min.



CURVES represent cooling of chocolate that was tempered for varying lengths of time at 31 deg. C.

Jiffy Test of Chocolate Temper

Simple method of taking 30-sec. temperature readings of sample cooled by dry ice-acetone mix proves reliable index of product's cooling characteristics

NELSON R. EASTON, DOUGLASS J. KELLY, and LESTER R. BARTRON

Chemistry Department, Lehigh University, Bethlehem, Pa.

Newly developed is a rapid and easy method for determining the temper of melted chocolate—and thereby gaging its cooling characteristics. This new procedure is based on the relationship between the cooling rate and the amount of heat of crystallization which must be removed from the chocolate.

The apparatus employed comprises a sample-holding glass tube fitted into the neck of a bottle (providing an air jacket around sample of chocolate) and placed in a jar containing coolant (see drawing). The tube contains a two-hole stopper, into which is inserted a stirring rod and a thermometer with graduations of 0.2 deg. C.

The coolant is a dry ice-acetone mixture capable of speedily lowering the temperature within the bottle to —70 deg. C., thereby enabling a better and quicker test than ice or ice-salt refrigerants.

Procedure: First, 40 to 50g. of tempered chocolate are poured into the sample-holding tube, which is then inserted in the bottle. Enough time is permitted to elapse between pouring the sample and placing the tube in the bottle to allow the thermometer reading to reach the temperature of the chocolate.

As soon as a drop in temperature is noted, the reading is recorded. Then, 15 sec. later, the chocolate is stirred, using only three strokes. Next, another reading is taken—30 sec. after the first one. Then, after a wait of 15 sec., the chocolate is again stirred.

Readings are now continued every 30 sec. for approximately 11 min. The chocolate is stirred only during the first 2 min., or until the stirring rod freezes in the sample. Any further agitation would introduce air gaps around the thermometer.

There are three general phases in the cooling of tempered chocolate. First, the temperature of the chocolate takes a rapid drop. Second, it continues to decline at a slower rate and, in the case of poorly tempered chocolate, the temperature may even rise. Third, a rapid fall in the temperature occurs.

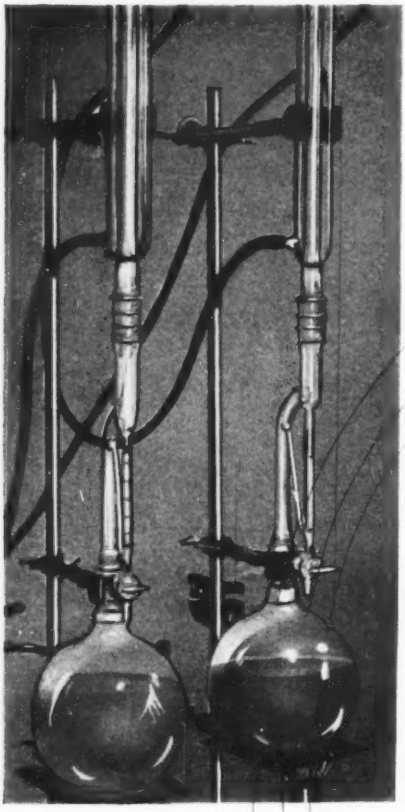
As chocolate approaches the proper temper, the middle or slow-cooling phase takes place at a high temperature and to a lesser degree.

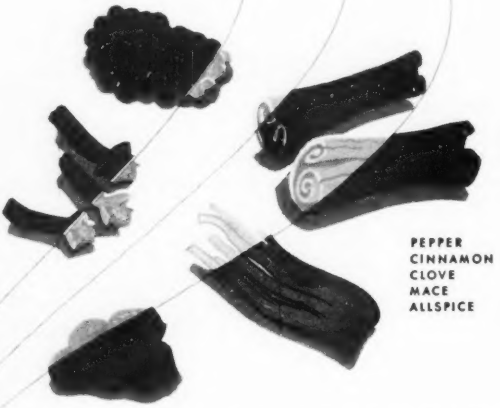
Curves representing the cooling of chocolate that was tempered for varying lengths of time at 31 deg. C. are shown in the accompanying graph. Results were obtained with the new test method.

The curve for the sample held 1½ hr. at 31 deg. C. is typical of a chocolate in very poor temper. Its initial rapid drop is due to super-cooling—made possible when only a few seed crystals were present. Leveling of the curve indicated a period of crystallization when the temperature change was arrested because heat of crystallization rather than sensible heat was removed. When the rate of crystallization decreased, the heat withdrawal again shifted to favor the sensible

(*Turn to page* 155)

The Taste of Sunshine—All the Time





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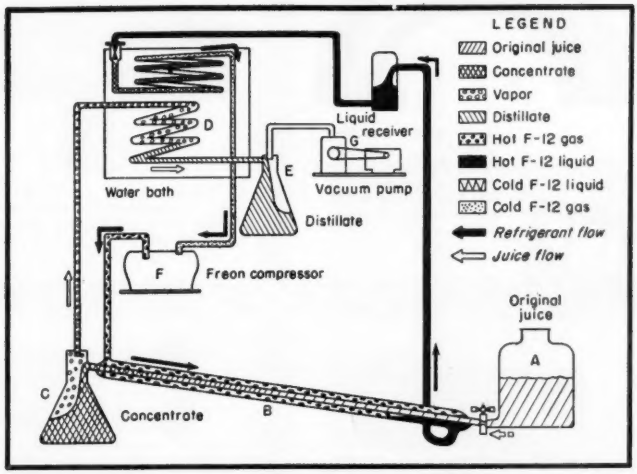
Schematic Shows How Evaporator Works



JUICE from jar (A) flows into heater (B), where it moves counter to hot refrigerant gas. This produces a concentrate that flows into flask (C), and a vapor that is condensed in cold water-immersed coil (D) and goes to flask (E). Freon compressor (F) produces heat for evaporating juice, and cold to condense vapors. Vacuum pump (G) sucks juice and vapors through system.

This Pilot Setup Points Way To New Juice Concentrates

Experimental low-temperature evaporation of untried food products seen as rewarding project if patterned after Michigan State's simple, small-scale process

W. M. CARLETON and T. A. CURTIS

Assoc. Professor, and Graduate Student, respectively, Dept. of Agricultural Engineering
Michigan State College, East Lansing, Mich.

Feasibility of low temperature concentration of juices of Michigan apples and plums is indicated by results of experiments recently concluded at Michigan State College.

Main object of the project was to provide apple growers with means of receiving a good price for the numerous seconds and culls (principally Delicious apples) that are an annual problem.

With this in mind, we were concerned—as would be anyone making a similar evaluation—with the following questions:

1. Could the particular fruit juice be easily evaporated in conventional equipment?

2. Would taste panels deem the final product acceptable?

3. Are the economies of fruit supply and potential consumer demand favorable?

To find the answers to these questions it was necessary to set up a pilot process. First step was to design a low temperature evaporator that could be built at modest cost, and which would simulate a commercial unit.

Evaporator Design

A refrigeration system was chosen as a basis for pilot evaporator design because of inherent efficiency and simplicity of small scale control. Thus, in our unit, hot gas from the high-pressure side of the compressor boils incoming juice, and cold liquid refrigerant condenses vapors. A ½-hp. electric compressor provides this refrigeration cycle. The unit is hermetically sealed and uses Freon 12 for a refrigerant.

An inclined double stainless steel tube comprises the evaporating vessel. Juice flowing into the ½-in. inner tube picks up heat from hot refrigerant gas circulating in the outer space (see schematic above).

Partially concentrated juice flows from evaporator to a 4 liter flask. Vapors are drawn off to a block-tin coil immersed in a cold-water bath, which effectively condenses them, then they drain to a 2 l. flask directly connected to a vacuum pump.

System vacuum is pulled by a 115v. ⅛-hp. motor with a V-belt drive. Subcooling the condensate protects this unit against excess moisture. With the refrigeration system functioning, this pump lowers the boiling point of water to 85 deg. F. However, when heat source is shut-off the boiling point drops to 60 deg. F.—due to a complete removal of vapor immediately above the juice.

Evaporating system capacity during pilot runs is 1 gal. of whole juice. Rate of water removal is 1/20 lb. per min., or 3 lb. per hr. To concentrate 1 gal. of 4-to-1 would then theoretically require a 2 hr. operating time.

Actually, the period averages 2 hr. 40 min. because of time needed to transfer partially concentrated juice back for another pass through the system. Four such passes are required—a movement comparable to a quadruple-effect continuous evaporator. A longer evaporating tube, with greater heat-transfer surface, would undoubtedly reduce the number of passes required.

Pilot Vs. Commercial

Main advantage of this design of pilot evaporator is the large temperature differential it provides—a desirable factor for experimental purposes. Such a differential lowers equipment cost, since relatively small heat transfer area is needed compared to when operating on a narrow temperature difference between product and heating medium.

However, a commercial system parallel to the pilot design would undoubtedly do away with cold water condensing and use a smaller temperature differential over more heat-transfer area. Such a system, while initially costly, would prove more economical in time because of the more efficient use of its refrigeration equipment. Further, the commercial unit would also take advantage of the higher coefficient offered by a more direct heat transfer from boiling liquid to condensing vapor.

Data on the performance of a pilot

Try

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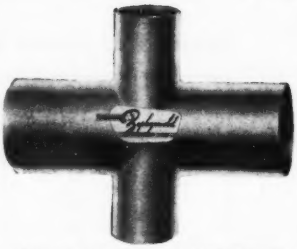
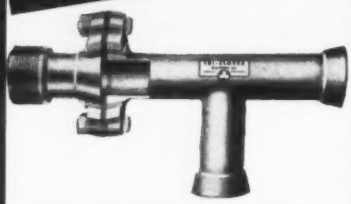
"ZEPHYRWELD"® WELDING FITTINGS . . . SS Type 304, 347 and 316—Inconel and other SS analyses. Fabricated in O.D. Tube Size, ½ in. thru 24 in.—ells, tees, adapters, etc. Covered in Catalog 748.

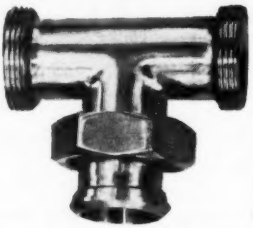


SCHEDULE 5S and 10S WELDING FITTINGS . . . "Zephyrweld" SS Type 304, 347 and 316, full range of sizes from ½ in. thru 24 in. pipe, for use with Stainless light gauge pipe. Covered in Catalog 1051.



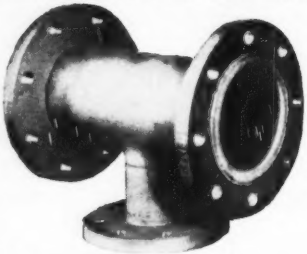
CONICAL END FITTINGS . . . Stainless Type 316 — Inconel and other SS analyses. Complete line, sizes from 1 in. thru 4 in. O.D. Features: Light weight — low cost — fast installation — leak-tight — easily adapted to other fitting types. Covered in Catalog 848.

RECESSED-END FITTINGS . . . Stainless Type 304-347-316. Low cost, light weight fittings for fast, simple soldering, brazing or socket welding. Sizes from ½ in. thru 24 in. Full line of elbows, tees, adapters, etc. Covered in Catalog 948.



SANITARY TYPE FITTINGS . . . Stainless Steel and Tri-Alloy (Nickel Alloy), from 1 in. thru 4 in. O.D., full range of fitting types. Approved as meeting 3A Standards throughout, incorporating exclusive design features. Covered in Catalog 150-B.

SCREWED FITTINGS . . . Stainless Steel Type 304-347-316. Complete range of fitting types. Meets the demand wherever flanged and screwed fittings are required. Clean-cut, accurate I.P.S. threads. Covered in Catalog 451.



PREFABRICATED FITTINGS . . . such as this butt-welded, flanged assembly, available in a wide range of types and sizes to meet special requirements.

STAINLESS STEEL TUBING AND PIPE . . . a most complete line, in all popular stainless analyses, wide size range, polished or unpolished.

INDUSTRIAL VALVES . . . Tri-Clover offers a wide selection of standard and special design valves in a wide range of types and sizes to meet practically every corrosion-resistant requirement.

NEW PUMP CATALOG 250 . . . contains complete pump data never before published — covers the full 1951 Tri-Clover Pump Line for every application. Write for your copy now.

Here you see representative fittings, valves, pumps, tubing and pipe that go to make up the *complete* Tri-Clover line—all available from *one* source. Install these stainless steel or alloy products in your process lines and realize the advantages of increased production and lower maintenance cost. 32 years of specialized experience in solving corrosion piping problems can be yours by consulting our engineers.

Write for details, or see your nearest Jobber.

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TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

THE Complete LINE

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

evaporator should be of great value in setting up a commercial process at a later date. In this case the average condensing pressure and temperature of Freon in the refrigeration cycle was 215 psi. absolute at 137 deg. F. In the evaporator body, boiling Freon was at an average pressure of 35 psi. absolute at 18 deg. F.

Incoming temperature of juice to the evaporator was 60 deg. F. Under a pressure of .74 in. Hg absolute, the juice boiled at 95 deg. F.—an average temperature for all juice concentrations.

Since about 2.8 lb. of vapor evaporate from the juice per hour, and about .8 kw. power is used, it is figured that the pilot system removes 3.5 lb. of water per kilowatt-hour. With power at 3c. per kwh., cost per pound of water removed is 0.86c. Also, since the unit has an evaporating surface of 1.075 sq. ft., it requires only 0.384 sq. ft. of surface per pound of water vapor removed per hour.

Process Used

Actual runs in these studies involved the following apple varieties: Northern Spy, Grimes, Jonathan, Delicious and a crabapple. Plums were also run, including Italian and Japanese Red Prune. In addition, celery and blueberry juice were investigated for beverage purpose, but showed little possibilities.

Apples were grated and pressed in a 10-ton laboratory unit. Pectinol A was added at a rate of 12 oz. per 100 gal. Juices were allowed to set at room temperature for 5 hr. and at 36 deg. F. for 15 hr. Clear juice was then siphoned off, concentrated without filtering, and immediately frozen.

Plums were washed and pitted, with halves placed in an open steam jacketed kettle for heating to 160 deg. F. While the batch was gently stirring, 4½ oz. of Hyflo Super Cel filter aid was added to each peck of plums. The heated plum halves were then transferred to a nylon bag and pressed at 500 psi. in an experimental hydraulic unit.

The resulting pressed juice was clear, of deep color, and very astringent to taste. Pectinol A was added at a rate of 12 oz. per 100 gal. A setting period similar to the apple juice followed before clear juice was run through the evaporator and frozen.

Acceptance Tests Follow

All concentrated and reconstituted products were compared with samples of unprocessed whole juice by a large group of judges made up from a number of college departments. Also, blends were made and these compared in reconstituted and whole form.

An interesting result of the studies was that the taste panel uniformly preferred a blend of reconstituted apple juices—including a great percentage of the Delicious variety—to regular apple juice. The economic advantages of this are apparent in Michigan, where, as stated earlier, there is annually a large number of Delicious culls and seconds that might well receive a good price in a commercial blended apple beverage offering such outstanding taste appeal.

MOBILE RECORDER, now in use on Good Humor trucks, graphically portrays temperature variations inside truck body during a vending day.

"Rough Riding" Unit Charts Truck's Cooling Efficiency

Plotting of temperatures of frozen cargo in transit spots faults in carriers, and aids in better body design

FROZEN FOOD quality can be dealt a serious blow if transport temperature goes unguarded. An upward trend in carrier temperature leads—unless checked—to soggy, thawed products and a deflling of even the best brand name.

But bumpy roads and swaying cargo provide a poor setting for the use of recording thermometers. For jiggling instrument pens—geared to a sensitive measuring system—will record more vehicle motion than temperature. Hence, a veritable redesign of the conventional thermometric nervous system was in order before effective recorders were "readied for the road" by instrument companies.

Such a development is exemplified in the miniature mobile recorder made by Tagliabue Div. of Weston Electrical Instrument Corp. To preserve the sensitivity of filled-system measurement, a bellows has replaced the vibration-sensitive conventional spiral or helix. Further, the rather delicate mechanical linkage between pen and spiral normally used has been superseded by a stabilizing spring between bellows and pen arm.

Other specialized features of the unit include a 7-day chart, graduated −10 to +40 deg. F. and rotated by a hand-wound clock. Although this chart has a radius of less than 2 in., its narrow temperature span allows 1-deg. divisions and legible inking within this tolerance.

Such a recorder fills the following long-standing gaps in frozen-products handling—

1. Carriers, retailers and operators are afforded documentary protection against spoilage claims. (*Turn page*)

Carbon, Alloy and Stainless steel tubes are defined under CMP regulations as "controlled materials". As such, they are critical materials. Not being a mind reader, "Mr. Tubes"—your B&W Tube Company representative—needs a *close* look at the following facts in order to supply the available tubing most economically suited to your requirements.

1 All related CMP authorizations and government contract numbers.

2 Any acceptable alternates in type, finish, composition, and size.

3 A brief, informative description of your intended fabricating methods.

4 A description of the end-use, exact as to product and its service.

THE BABCOCK & WILCOX TUBE COMPANY

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Sales Offices: Beaver Falls, Pa. • Boston 16, Mass. • Chicago 3, Ill.
Cleveland 14, Ohio • Denver 1, Colo. • Detroit 26, Mich.
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Syracuse 2, N. Y. • Toronto, Ontario • Tulsa 3, Okla.

B&W SEAMLESS and WELDED TUBES

TA-1640-G

2. State and community boards of health have evidence of careful food handling.

3. Refrigeration equipment and carrier manufacturers can verify the efficiency of their units.

An example of how the Tag mobile recorder fills the above requirements is found in its use by the Good Humor Co. (see photo). The latter's route vending trucks are refrigerated each night by cooling pads, which are charged with ammonia for more than 7 hr. By locating recorders at various points in the ice cream load during a vending day, the company is on the track of ideal positioning for the pads in its larger trucks.

End

Top Label Foods

—*Continued from page* 82

that procedures are developed that will insure quality being maintained throughout the processing operation. Throughout the winter months our quality control department outlines the control procedures and the specifications that we want each plant to maintain during the packing season. This training period enables our plant supervisors to know exactly what quality will make the Stokely Finest label. There will be set up certain check controls so that during the pack the plant will know whether it is, or is not, meeting this quality specification.

During the pack, our quality control department assigns to each producing area representatives who can carry out these control procedures each day. So that there will be a greater uniformity of quality in our 63 plants, each plant is required to send daily samples to our general office throughout the packing period. These samples are checked daily by our quality evaluation department. Comments, criticism and recommendations are telephoned promptly to the plant, particularly on such products as peas, corn and tomatoes, where a plant might be a little low in its quality sights and thereby ruin a whole pack because it is not good enough for the "Finest" label.

Training Down the Line

Our training department cooperates with quality control in training production employees at the beginning of each season. A qualified trainer visits a seasonal plant immediately prior to the pack. This trainer confers with the plant manager, the plant superintendent, and quality control representative on the proper processes for each item. Then the trainer selects a number of employees to train in each operation.

These employees, in turn, train the other seasonal workers who must be employed as the season progresses. This program must be of necessity closely coordinated with the industrial engineering division.

During the winter we concentrate on supervisory training, which has more to do with the proper handling of our employees, the keeping of their personnel records, the allocation of work to employees, and employee job placement.

Seasonal packs are concentrated during a very few days of operation, and during the packs the greatest emphasis is upon getting the raw material into the can and processed as quickly as possible. Therefore the work of our industrial engineering department during the season must be of such nature that results can be speedily obtained. Any studies it makes during the pack must be pointed also toward improving our operations in future years. The work it has done during the past year, and the planning done with the mechanical engineering department and plant managers throughout the winter months, must pay off during possibly a three or four-week production season.

The planning of harvesting schedules so that a more uniform production flows through the plant, the elimination of equipment of bottlenecks, and the proper layout of equipment—all of which must have been arranged well beforehand—will result in lower direct labor costs. The early planning, which funnels more production into the most efficient plants, results in lower labor costs and reduces the indirect expense of these plants.

During the actual production season our industrial engineers must work very closely with the plant organization to see that the cost and usage control reports are properly carried out so that the plant manager knows daily whether he is meeting his standards of labor and material usage.

We at Stokely feel that our program has definitely paid off in big savings and in increased quality production. We are just beginning to receive the benefits, one of the greatest of which has been the strengthening of our widespread organization so that each member knows what is expected of him by the general office management.

Companies that have relatively few plants have been able to make them very large and efficient. They have had an entirely different set of circumstances to face. As pointed out earlier, we feel there are definite advantages to our widespread operations in a number of small plants. But we do have a harder job in the organization of the work for these plants. However, that is what management is paid to do, and we look forward to the long term gains we know will result from better training of our organization toward producing a higher quality product at a lower cost.

End (*resume reading p.* 83)

What's Coming Up in FOOD ENGINEERING

Special articles with the accent on the "how"—to help you do a better job of producing quality food products at low cost—are now in preparation for early issues of FE. Here are just a few of them:

Solves Waste Problem, Saves Too
Advanced Air Conditioning Boosts Bakery Output
Canned Cream Whip—How It's Pressure Packed
Sharper Flavor Ratings With Improved Profile Test
Cheese Coating Goes Continuous
Trucking of Liquid Sugar Is Fast and Flexible
It Cleans Evaporator Tubes Faster
Military Packaging Requirements and Problems
Continuous Processing of Jams and Jellies
Advanced Engineering Produces 10-Cent Fried Pies
Prepackaging Meat to Boost Sales
Handling Materials Efficiently in Brewery
New Processing Technics Improve Candy Production
Poultry Plant Built for Efficiency and Quality

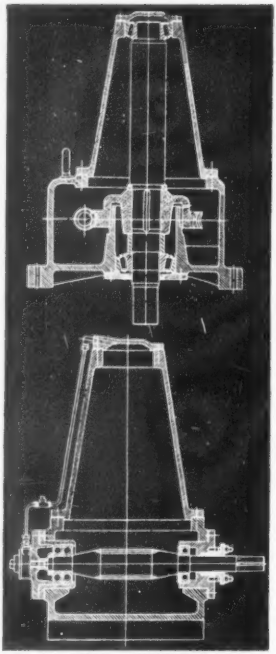
for long, unsupported

VERTICAL OUTPUT SHAFT EXTENSIONS

Use the PHILADELPHIA "STEEPLE" TYPE WORM GEAR REDUCER

The exclusive Philadelphia "Steeple" type Vertical Worm Reducer was especially developed for the numerous Process Industries for driving: Agitators, Mixers, Circulators, Pumps, Washers—and other vertical type drives which call for sturdy, reliable speed reduction.

The wide bearing span insures rigidity for the extended shaft—the "dry-well" construction eliminates the necessity of a stuffing box on the vertical shaft. To insure positive lubrication of the upper bearing on the vertical shaft, an automatic reversing oil pump, together with a filter, is embodied within the unit housing. Write for full details on your Business Letterhead.



The views above illustrate cross sections through the worm and worm gear shafts. Note absence of stuffing box on vertical shaft (at top).

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IN CANADA: WILLIAM AND J. G. GREEY LIMITED, TORONTO

Industrial Gears and Speed Reducers
LimiTorque Valve Controls

Piloting A New Product

—*Continued from page* 104

research and development department in Chicago and the plant. This cooperation is most essential, because there has been no earlier fundamental scientific information on the manufacture of this product and its use in prepared mixes. The real story of powdered shortening began with Beatrice's development and patenting. So the integrated pilot-plant operation and bakery laboratory research that is always in progress in Chicago must, of necessity, mesh with the commercial operation in Beloit.

Key unit in the Chicago pilot plant is the small-scale spray dryer used to run the first test batch of a newly-developed formula. This utilizes the same size and design spray nozzles as the plant dryer. It has a capacity of 50 to 60 lb. of powder per hour.

The baking research laboratory is the central point for control of our product—from formula to finish. It was here that the product was first conceived and developed. All new formulas are worked out on its benches, all ingredients receive testing with its facilities, and shelf-life studies of all finished goods are made under its auspices.

In addition, baked goods from prepared mixes containing our product are made in our laboratory oven. These are evaluated from the consumer's standpoint.

The close teamwork between central laboratory and commercial plant is, in fact, the cornerstone of this product's increasing acceptability. Without it, commercial production of powdered shortening would be decidedly hobbled.

End (*Resume reading on p.* 105)

Chocolate-Temper Test

—*Continued from page* 147

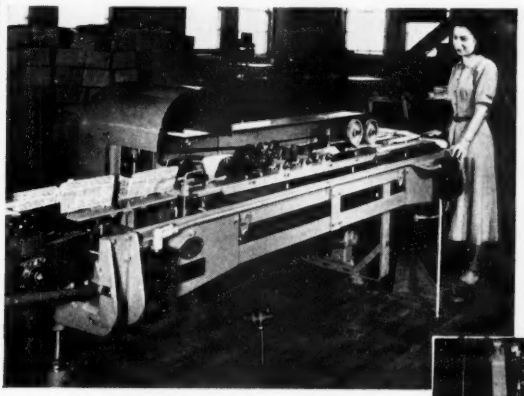
heat, and the temperature dropped as before.

In the case of the sample which was tempered for 3 hr., the super-cooling rate was not as great and, because of the greater number of seed crystals present at the start of cooling, the level of maximum crystallization occurred at a higher temperature.

Curve for the sample tempered 6½ hr. is similar to the one above. However, due to the higher ratio of crystals to liquid in the sample before cooling, the level of crystallization occurred at a still higher temperature.

The sample tempered 7½ hr. at 31

NEW ADJUSTABLE CARTON CLOSER



New Carton Closer in the Grocery Store Products Company plant. After being closed, cartons are wrapped on our FA machines.

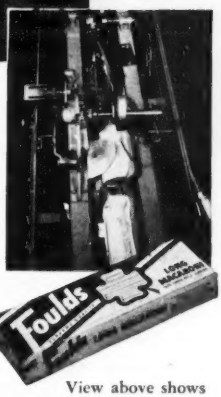
An Immediate Hit!

This is what users of plain tuck-top cartons and lined tuck-top cartons have been looking for—an ADJUSTABLE closer that can take care of a large range of sizes.

Our new Carton Closing Machine is meeting with enthusiastic approval and orders for it are coming in fast. One leading food company, on seeing what it can do, immediately ordered a large group of machines for its various plants.

The machine can be adjusted for a different size of carton by two simple hand-wheel adjustments. Its speed, ranging from 34 to 102 cartons per minute, is set by a single hand-wheel adjustment. Legs of machine can also be adjusted for height so it can be hooked up with any standard conveyor leading to the packing tables, filling machines or wrapping machines.

Its advanced method of operation assures tight closures, with liners neatly folded.



View above shows top of machine with rotary tucker making first fold on the inner liner. Can be adjusted for following sizes by means of two hand-wheels:

Length: 3¼" to 14"

Width: 2½" to 9⅞" (1⅞" possible with special parts)

Height: ¾" to 4½"

•

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deg. C. showed almost a constant cooling rate, thereby giving a curve approaching a straight line with a slope only slightly different from the previous one. But unlike the latter curve, no level portion appeared. These characteristics are typical of a curve representing well-tempered chocolate —proved to indicate good tempering by the excellent shelf-life of pieces produced under identical conditions.

An over-tempered chocolate—one in which the tempering process is carried too far—is represented by the final curve. In this condition, the chocolate is too viscous for most work, and it is likely to freeze in its container.

The above article is part of a paper, "A Rapid Method for the Determination of the Temper of Molten Chocolate," which was presented before the recent Pennsylvania Manufacturing Confectioners Assn. meeting at Bethlehem, Pa. The work was supported by the PMCA's research committee.

End (Resume reading on page 149)

Process Performance

—Continued from page 72

second and third sections. The second section has water of a lower temperature (100 deg. F.), this water being pumped from the third section. In the third section, preheated feed water (50-65 deg. F.) is piped from city supply to spray headers. Cooling water is not re-used, being piped to the sewer.

An air blower at the discharge end of the cooler dries the wet jars before they go to the labelers. This blower is driven by a 5-hp. motor.

6—Four-Label Line

Flexibility keynotes the company's labeling line, which has been set up to handle as many as four different brand labels at the same time. Mitchell's does it this way: Jars coming from the cooler are fed to two lines. One line conveys them to a Beeline automatic labeler, handling 100 jars per minute, depending upon their size. On the second line, jars go to three Pony semi-automatic labelers, each handling about 35 jars per minute.

Whenever the labelers stop operating due to label changeovers or mechanical difficulties, a caster-mounted tray table is rolled over to take jars coming from the discharge end of the cooler. These jars are fed in when labeling operations are resumed.

7—Efficient Filtering

To manufacture pure fruit jellies, juice must first be pressed from the

fruit and then clarified. Juice is hydraulically extracted from the fruit under 1,000 psi. pressure in a 3,000-lb.-capacity rack-and-cloth press. Next, the juice is pumped to two 300-gal. stainless steel treating tanks, equipped with stainless steam coils and propeller type agitators. Here, the juice is heated to 180 deg. F. as filter aid is mixed into it.

From the treating tank, the hot juice and filter-aid slurry is gravity-fed into a 45-gal. jacketed holding kettle. This kettle is equipped with a float to keep the level of the liquid uniform, a propeller-type agitator to prevent the filter aid from settling, and a temperature controller to maintain the temperature of the juice at 140 deg. F. And subsequent flow of juice through a plate-and-frame filter is more uniform and rapid.

8—Rapid Cooling

If the juice is to be used immediately, it is pumped directly to five 150-gal. steam-jacketed cooking kettles. On the other hand, if the juice is not to be used at this stage for making jelly, it goes through a company-built cooler. This unit consists of a copper kettle with 30 ft. of copper cooling coils. Running cold water and sometimes ice are employed for cooling.

Further cooling of the juice is achieved by a multi-barrel filling system. Featured is a cooler-discharge pipe having four outlets for filling four seasoned oak barrels simultaneously. Barrels of juice are then transported to an adjoining freezer, where they are slush-frozen and stored until needed.

9—Separate Storage Rooms

In the event of an emergency, such as breakdown of machine along the production line, juice or fruit is transported to either of two company storage rooms—a cooler (32 deg. F.) or a freezer (20 deg. F.). Both rooms are 40x60 ft., and they are next to the processing department.

The costs saved by these rooms are those that would be entailed in hauling the fruit back to the commercial cold rooms and the charges for additional storage (levied for a month though storage time may be shorter).

Prior to cooking the jelly, juice is pumped into three 500-gal.-capacity stainless-steel holding tanks, equipped with steam coils and temperature controllers. The juice is heated to 160 deg. F., then pumped in gaged amounts into five 120-gal.-capacity steam-jacketed kettles into which liquid sugar is metered and other material added.

10—Cutting Down on Pumps

After batches are open-kettled cooked to a 65-66 per cent soluble solids

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A leading factor in the business economy of Pan American World Airways is evidenced in the extensive system of fire protection which was recently installed at the Company's huge Miami, Florida Overhaul Base. At this multi-million dollar facility, all classifications of aircraft, including giant Clippers costing as much as $1,500,000 each, undergo complete servicing and minute inspection. The entire operation is safeguarded from fire by means of "Automatic" Sprinkler systems, scientifically designed for the special hazard of airplane storage and repair. Over 15,000 fixed temperature and Rate-of-heat-Rise operated sprinklers are ready at all times to provide instant, effective protection at the first indication of flame.

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content—determined by a refractometer—the jelly is drawn off the kettles and caught in an enclosed stainless steel trough feeding a 27-gal. rectangular stainless steel holding tank. Setting of the trough on a slight incline enables gravity-flow of the jellies from the five cooking kettles to the tank. Through this arrangement, only one pump is needed to deliver jellies to the cooling pan. What's more, the trough can be quickly dismantled to facilitate cleaning and change-over from one type of jelly to another.

Pure jellies then are machine-filled into jars, which are finally automatically capped, spray-cooled, labeled and cased.

Apple jellies containing cherry, raspberry, grape and elderberry juices are prepared on the preserve line. The juices, liquid sugar, sugar, pectin, and fruit acid are first preheated in the three 150-gal. premelt kettles, then are drawn into the vacuum pans, where the jellies are concentrated to 67 percent soluble solids content.

Next, these jellies are gravity-fed to the cooling pan, from which they are pumped to the 10-spout filling machine. They are then filled—2 lb. to a jar. Finally, the jars are capped, cooled, labeled, and cased.

End (Resume reading on page 73)

Synthetic Can Linings

—Continued from page 116

because any exposed areas of tin plate (uncoated areas for soldering or the reverse side, if bare) are apt to be oxidized or discolored excessively when temperatures approaching 450 deg. F. are used for an appreciable portion of the present baking time.

An extensive program of testing is necessary to provide the facts required for the approval of an enamel to meet can specifications for each product. Although there are some relatively fast preliminary or screening tests, can linings cannot be approved with assurance unless they are extensively evaluated under commercial conditions.

This means that a representative commercial lot of the liquid lining must be applied, cured and evaluated in the form of finished cans that are packed with various representative products and examined for a period approximately equivalent to the expected life of the packed container.

Packed cans with new types of linings must be evaluated by careful examinations over a period of at least a year and probably longer. Can linings that differ only in a minor way

from those that have already been approved, may not require the extensive testing needed for completely new linings. However, what may at first appear to be only a minor change in formula or manufacturing practice, designed as an improvement in some respects, may well result in other cases as an objectionable weakness. Even though the evaluations are time consuming and expensive, they provide the best known insurance against losses of canned food through subsequent can-lining failures.

Although linings may be only a small part of the total cost of a packed can, they must be economical. Not only does one type of lining compete with another, but so do various types of containers. Availability is, of course, a complicating factor.

Recent restrictions regarding the use of tin have made it necessary to use plate with lighter tin-coating weights, or steel plate without tin, thus calling for compensation for these substitutions by using organic-protective coatings. This situation puts an additional burden on the rather limited enameling and baking equipment now available, and it may result in a less economical container or one with somewhat less service life. Appearance also may be changed.

During World War II, the extended use of can linings aided considerably in the conservation of tin without undue jeopardy to quality. However, it required an extensive developmental program on materials and procedures.

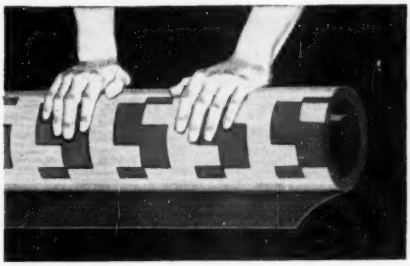
Future Trends

The metal can has certain inherent desirable qualities as a container to transport and store perishable foods. And, along with other similar containers, it should continue to be in demand. The present demand for can linings probably will be not only sustained but actually is expected to be appreciably increased. We may not be certain of the nature of these future demands, but there are indications that along with the general progress in the industry, the advancements in can making and canning will call for improved can linings.

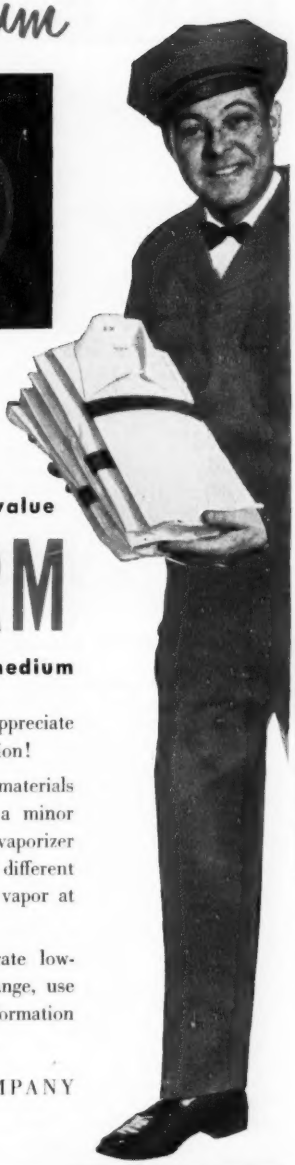
Accompanying the trend toward more automatic can-manufacturing equipment will be one toward simplification of applying and baking operations. Time is a very important factor in these operations, and there are indications that at least some of the future can linings may be baked or cured in 1 min. or less. It does not seem probable that such rapidly cured linings will come from the conventional oleoresinous field, but they may be expected from the relatively new synthetic resin field.

End (*Resume reading on page* 117)

from linoleum



to laundries!



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NEW PACKAGES & PRODUCTS

Stable Foods In Liquid Form

Various solid products converted to liquid form have long been recognized as ideal in the preparation and processing of certain food items. Some of these are now being introduced to the consumer trade.

Among the most outstanding are liquid spices and liquid cheese, now being marketed by Vanguard Savorizer, Inc., Chicago, and Geed, Inc., Newark, N. J.

The Vanguard Co., supplier of liquid spices to the food industry for more than 50 yr., states that its new solubles are made from pure whole spices from which are removed only essential volatile oils and oleoresins. Being highly concentrated, they dissolve immediately in water and quickly flavor food.

To educate the consumer on the use of these products in her ordinary cooking, this company now offers a blended liquid spice set—a combination of various concentrated spices in liquid form, together with a Savorizer. The latter enables the housewife to inject the flavoring and spices directly into meats, fish, fowl before cooking.

For restaurant and institutional trade, this firm offers 18 basic and most-used spices, packed in 18-oz. bottles. Included are black pepper, clove, celery, cinnamon, sage, fennel, thyme, rosemary, cumin, sweet basil, tarragon, marjoram, mace, bay, allspice, coriander, nutmeg and ginger.

Convenient Cheese

The other new product—the liquid cheese introduced by Geed, Inc., is tentatively known as "Flueeda." It is intended for use by the cheese, dairy, baking and other food industries, as well as by the consumer trade.

Stated to be free of process salts, artificial substitutes, or other ingredients that would alter the natural taste of cheese, the product is reported marketable for less than solid Cheddar. It requires no refrigeration, either in transit or on the grocers' shelves.

The new cheese has the consistency of heavy cream and pours readily, and a great variety of commercial uses are seen for it. As for the consumer, it relieves her of melting cheese and can be used right from the can.

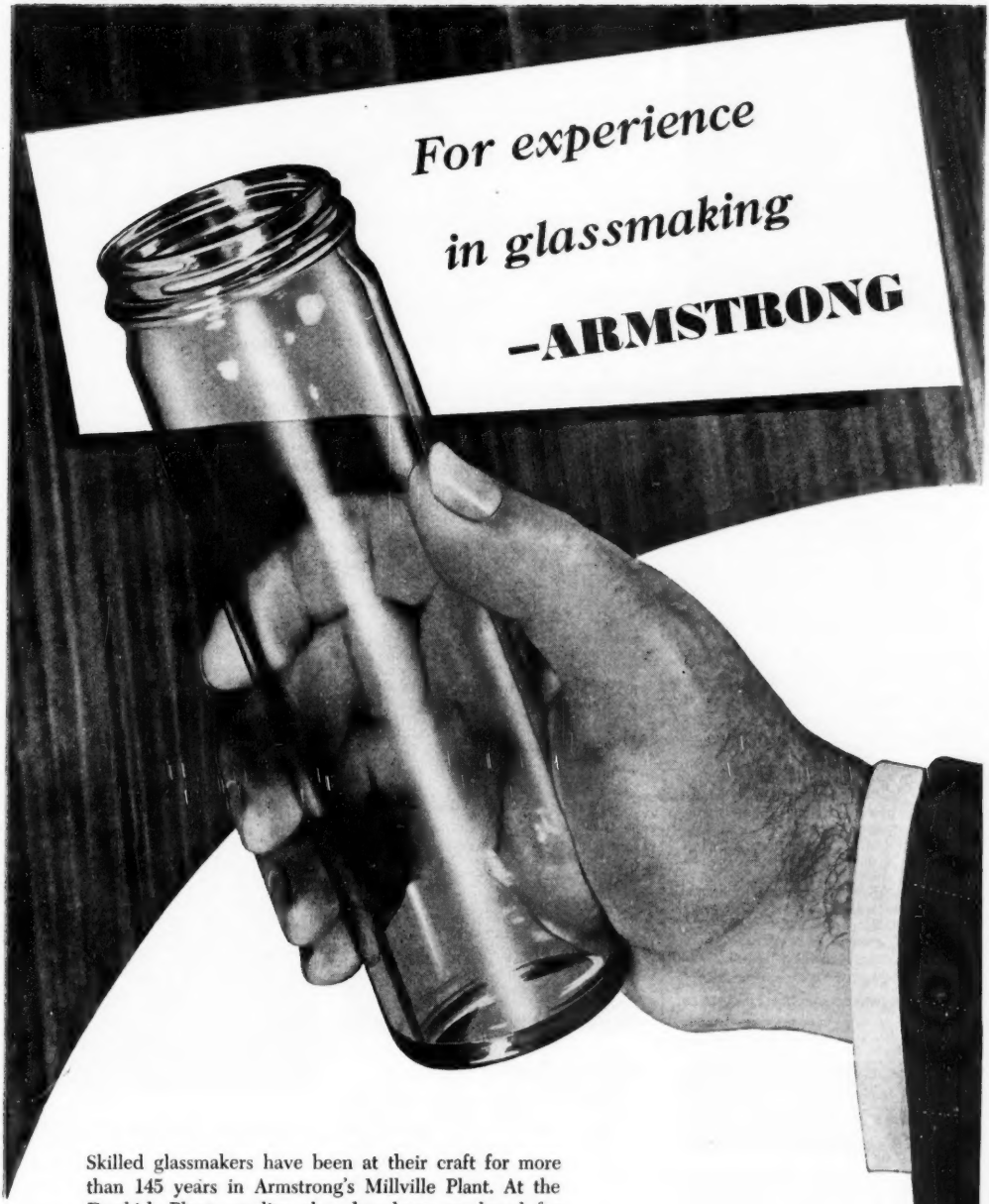
Midget-Size Frozen Turkeys

Particularly developed to meet the demands of small families and for one-meal eating, a midget-size turkey is now being marketed by Armour & Company, Chicago. Weights vary from 5 to 10 lb.

A comparison of the small turkey with the conventional bird can be seen (photo above). Fast grown in 18-20 weeks, they are said to be tender, plump, broadbreasted.

Under the brand name Armour Star Junior, these turkeys are cleaned, dressed, quick frozen and packaged in transparent Cry-O-Vac, product of Dewey-Almy Chemical Co., Cambridge, Mass., designers of the package.

For More Data on Package Supplies Named Use Reader Service Card



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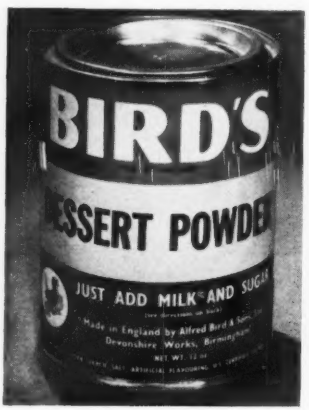
Lift-the-Flap Window Pack for Bacon

A lightproof package for its sliced bacon—with a novel flap feature—has recently been introduced by Geo. A. Hormel & Co., Austin, Minn.

When flap is raised from the Lumarith acetate window, visual inspection of the product is permitted. Then, with the flap down, the bacon is protected from exposure to light. Top of flap affords space for bacon picture as well as company identification.

The carton is a rigid, folding package of grease-proofed sulfite board, supplied by Western Waxed Paper Div., Crown Zellerbach Corp., Los Angeles. It was designed by C. D. Mullinix, Mullinix Packages, Los Angeles.

The acetate film is a product of Celanese Corp. of America, New York.



British Dessert Mix

Bird's Dessert Powder, made by Alfred Bird & Sons, Ltd., Birmingham, England, a subsidiary of General Foods, New York City, is now being introduced in this country. It will be distributed exclusively by the food division of the Hambro Trading Co. of America, Inc., New York City.

Sold in Great Britain for more than a century this product is mixed with milk to make dessert sauces and puddings.

The mix is being sold here in a conventional 12-oz. tin, also in a new package designed to meet the demand for pre-measured desserts. The latter contains six handy envelopes that when reconstituted make six pints of pudding or sauce.

Miniature Donuts

Called "Small Frys", a crisp-cake midget donut is now being distributed by Confections, Inc., Chicago.

The product is packed in 5-oz. quantities, averaging 21 to 23 donuts, in double-wall, heat-sealed cellophane bags, furnished by Champion Bag Co., Chicago.

An attractive counter display containing 12 bags are merchandised in a unit, as shown above.

Glamorized Corn Mush

Corn meal mush, in itself possessing very little eye appeal, is being marketed by North Side Packing Co., Pittsburgh, in an attractive as well as utilitarian package.

Packed in 28-oz. portions, carrying the company's Victory Brand trademark, the mush loaves are wrapped in a cellophane pouch with cling-seal coating produced by Milprint, Inc., Milwaukee. Pouch is heat-sealed, forming a sanitary casing that is reported air and moisture resistant, firm, and durable.

Under refrigeration, says maker, the mush will keep as long as 14 days without sign of deterioration.

Now—Frozen Strudel Dough

A package containing four Strudel dough sheets, 17 x 23 in., sufficient for two bars of strudel, is now offered by The Strudel Dough Shop, Belle Harber, N. Y.

The sheets of dough are folded, frozen, then heat sealed in a cellophane wrap, and finally packed in a chipboard container. Latter is illustrated with white lettering on a blue background. A pamphlet of instructions and recipes is enclosed.

Ingredients consist of flour, sugar, vegetable oil, salt, farina and leavening.

New On the Market:

—Minute Maid's (New York City) frozen concentrated pineapple juice.
—Korn Pops, a cereal product of Kellogg Co., Battle Creek, Mich.
—Kor-Jels, a pan-coated, jelly center candy, marketed by Thos. D. Richardson Co., Philadelphia.

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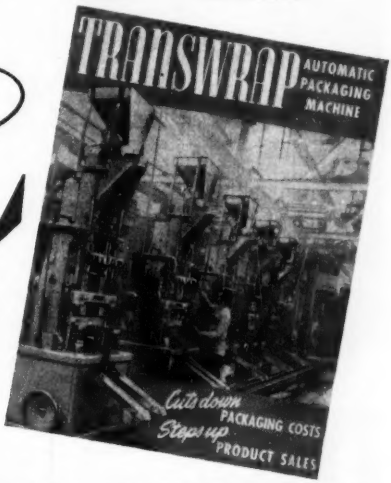

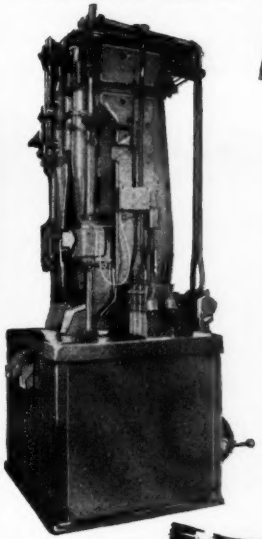

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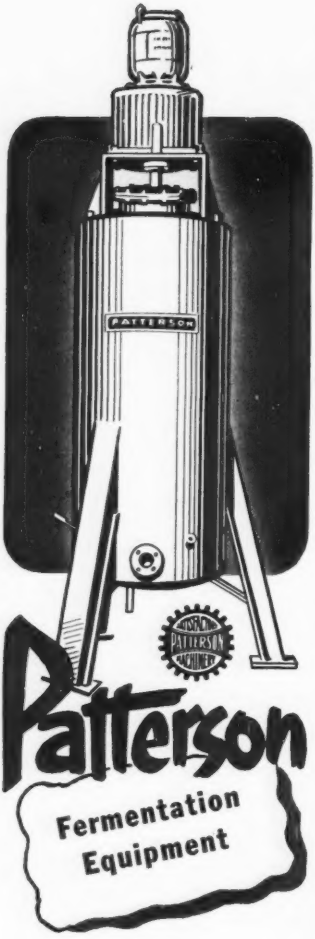

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Spice Cartons Redesigned

To make for easier recognition and improved eye appeal, the complete line of 24 different household spices has been repackaged by Albert Ehlers, Inc., Brooklyn.

The cartons are gaily decorated in printed red and blue on white, with large type for the Ehlers' brand name. The cellophane window permits view of the spices. These containers were designed and are manufactured by Robert Gair Co., Inc., New York City.

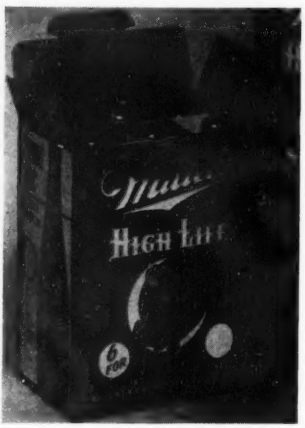
Gas-Packed Ice Cream Mix

Though the bulk of its output now is going to the armed forces, Maple Island, Inc., Stillwater, Minn., is newly offering a powdered ice cream mix to the commercial trade.

Packed six 4¼-lb. tins to the carton, the product is pasteurized, laboratory tested, and inert-gas packed. Method of processing and packing is stated to give the product uniform quality.

Because no refrigerated storage space is needed and preparation is simple, this mix is seen winning popularity among commercial users. In making the ice cream, it is only necessary to add 7 pts. of water to the contents of a 4¼-lb can, then whip and freeze.

Label design is by Smyth Printing Co., St. Paul. Tins are supplied by Continental Can Co., Minneapolis.



Beer In Take-Home Carton

Six-bottle lots of its well-known High Life beer are now being nationally distributed in a handy pack by Miller Brewing Co., Milwaukee.

Known as the Autovidor, the new carton eliminates glass-to-glass con-

tact, protecting bottles from breakage. The closed top also keeps bottles dust-free. The compact unit is easy to handle and can be readily stacked for display.

The package is printed in four colors, red, yellow, light blue and dark blue, on 32-point bleached manila-lined chipboard. Identification and trademark are displayed on the front, and full-size illustrations of the beer bottle are on the sides of the carton. In addition a disk for price-marking appears on the front and sides so that price can be easily seen.

Design of the package was by C. A. Mathisson & Assoc., Milwaukee, the company's advertising agency. American Coating Mills, Div. of Owens-Illinois Glass Co., Chicago, furnishes the cartons. And bottles are supplied by Glass Container Div. of Owens-Illinois, Toledo.

Food Color Blends

A new standard line of secondary blends of certified food colors has been introduced by Sterwin Chemicals, Inc., subsidiary of Sterling Drug, Inc., New York City. The additional colors are seen winning the interest of confectioners, bottlers, bakers, and other food processors.

Colors come in 1, 5, and 25-lb. metal containers and are also custom packed in smaller packages to meet specific demands.

Package & Product Shorts

Dietetic Cranberry Sauce

A dietetic cranberry product, for persons on diets free of sugar and salt, has been introduced by Ocean Spray, reports the National Cranberry Assn., Hanson, Mass.

Sucaryl calcium is used for sweetening, making the calcium content of the finished product 45 mg. per 100 g. The sauce contains only 10 calories per 100 g. Product is packed in 12-oz. jars, with the bright, tempting color of the cranberries illustrated on the label.

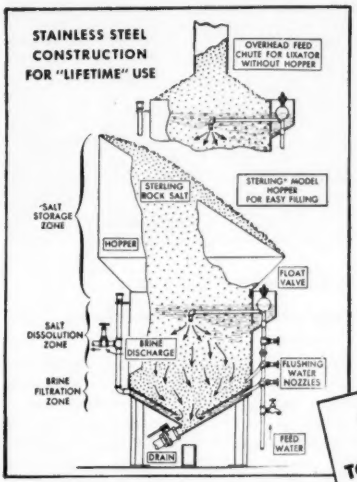
Plastic Cottage Cheese Container

A transparent plastic cottage cheese container, known as Fiesta Plastic Deep Dish, has been designed and developed for the dairy industry by G. P. Gundlach & Co., Cincinnati. The dish, available in red, green, sungold and white, may be re-used for kitchen or table purposes.

Making the Grocer Sales-Conscious

To keep the grocer promotion-minded, General Foods Corp., New York City, now imprints the following message on the top of every case of Minute Tapioca: "To Grocer: Minute tapioca sells best when put on the shelf next to other desserts." This move followed from the knowledge that for many years this product was not standardly classed on store shelves. Since Minute Tapioca is primarily a dessert product, it was thought logical to merchandise it along with other desserts, particularly now that it is being distributed in a colorful new package with illustrations of suggested desserts on the front panel. —End

SALT! WHY HAUL IT? MEASURE IT? STIR IT?



Just Turn It On!

STERLING ROCK SALT BRINE DELIVERED BY PIPE TO EVERY POINT IN YOUR PLANT

• FLAVORING • WASHING • SOAKING
• BLANCHING • GRADING • BRINE PEELING
• ZEOLITE WATER SOFTENERS • PICKLING

HOW LIXATOR WORKS

In the dissolution zone – flowing through a bed of Sterling Rock Salt which is continuously replenished by gravity feed, water dissolves salt to form 100% saturated brine. **In the filtration zone** – through use of the **self-filtration** principle **originated by International,** the saturated brine is thoroughly filtered through a bed of undissolved rock salt. The rock salt itself filters the brine. Nothing else is needed.

WHAT THE LIXATOR PROVIDES

- ✓ **Chemical and bacterial purity to meet the most exacting standards for brine.**
- ✓ **Unvarying salt content of 2.65 pounds per gallon of brine.**
- ✓ **Crystal-clear brine.**
- ✓ **Continuous supply of brine.**
- ✓ **Automatic salt and water feed to Lixator.**
- ✓ **Inexpensive, rapid distribution of brine to points of use by pump and piping.**

Savings up to 20% and often more in the cost and handling of salt have been reported by many Lixate users. Why not investigate?

• You can eliminate shoveling, hauling, and laborious hand stirring of salt and water, and frequent testing of the brine strength—with International's Lixate Process for Making Brine. Stops waste through spilling. Saves time and labor. Assures accurate salt measurement.

• The Lixator *automatically* produces 100% saturated, free flowing, crystal-clear brine — which may be piped to as many points in your plant as you desire — any distance away — by either gravity or pump. YOU SIMPLY TURN A VALVE for self-filtered, LIXATE Brine that meets the most exacting chemical and bacterial standards.

An INTERNATIONAL Exclusive

The LIXATE* Process

FOR MAKING BRINE

*REG. U. S. PAT. OFF.

INTERNATIONAL SALT COMPANY, INC., Scranton, Pa.

EXACT WEIGHT Selectrols (electronically operated) automatically checkweighing after-dinner mints in the plant of Thos. D. Richardson Co., Philadelphia, Penna.

Sound Packaging is an Engineering Problem . . .

Sound packaging becomes more and more an engineering problem in that equipment, other than strictly packaging detail, must be correlated to produce quality products profitably. From a packaging standpoint alone engineering thinking must consider packaging leak (over or underweight). This save dollars control measure is accurate checkweighing . . . by manual means if necessary . . . by semi-automatic methods when practical . . . by fully automatic application (as illustrated above). Present day EXACT WEIGHT Scales fit more different products; more high speed production lines; do more specialized jobs than any industrial scales at the disposal of engineers today. Are you setting up a new operation, redesigning an old one or just expanding your present system? Save time, money, product and man-hours equipment-wise by writing for full information pertaining to your particular engineering problem.

EXACT WEIGHT Scale Model #213-S, the most popular consumer packaging scale—Features (1) high speed operation due to extremely short platter fall, (1/4") (2) end tower construction which takes up less bench space, and permits, uninterrupted production across the scale while commodities are being weighed all in direct line of vision, 1 lb. beam, notched type. Dial 1 oz. over and under x 1/4 oz. graduation—Capacity to 3 lbs.

EXACT WEIGHT SCALES

Industrial Precision

THE EXACT WEIGHT SCALE COMPANY

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IFT Convention

—Continued from page 87

torting temperatures and hence later give rise to spoilage of canned foods. This improved yeast is now being added to baby and junior foods to increase their nutritive value through vitamin and protein supplementation. It is also being used to enhance the flavor of soups and soup-bases.

Moreover, this dried food yeast is now being added to paste products like Buitoni's 22 percent-protein pastina for the purpose of markedly increasing the efficiency of food utilization.

International Minerals & Chemical Corp. reported many new uses for monosodium glutamate. Among them were applications in tuna fish and baby foods, specialized dressings, tomato aspic mix, and prepared mixes like dumplings and potato pancakes. Meat packers are now adding this MSG to pickle solutions used for curing meats like ham and bacon. MSG so used does not have to be declared on labels. Also, this flavor enhancer is now being introduced with spices in the silent cutter when making sausage products like frankfurters, bolognas, and meat loaves.

New Equipment

Waste and mess in the bottling plant are avoided with use of a small, fast-acting device that detects capless, filled bottles. It employs an electronic eye that is adjusted for light reflective ability of various caps, lids and covers. Unit is attached on bracket of conveyor leading from capper and is tied back to filler motor stop circuit. Known as the Barnes-Gingrich Electronic detector, it was exhibited by W. F. & John Barnes Co.

Food Machinery & Chemical Corp. featured a Pilot Sterilizer for canners. It comprises an insulated, cylindrical chamber with a motor-driven reel that rotates the cans. Steam and cold water taps are provided. Variable speed drive is used to turn the reel at the required speed. Thus, the canner is able to simulate the actual processing conditions in the commercial size Anderson Barngrover cooker.

Time, temperature and pressure controls and indicating gages are built-in to provide full information on a pilot scale prior to commercial runs. Various size reels are available for handling cans from 8 to 14 oz. capacity.

A new Steinlite Model 300 liquid-cell moisture tester, which requires only 6 to 9 min. to make an analysis, was displayed by the Seedburo Equipment Co. Available with this unit are calibrations for lima beans, beef stew, tomatoes,

canned chicken and vegetables, and a limited number of other products.

The test consists of (1) mixing a weighed sample with a solvent, (2) clarifying the mixture by running it through ordinary filter paper, and (3) pouring the filtrate into the liquid cell of the tester. Actual moisture content is then determined by comparing the meter reading with the appropriate conversion chart. No special training or complicated laboratory technics are needed.

Seen at the booth of Magnus, Mabee & Reynard, Inc.: A device for adding a carefully measured, small quantity of spice oils into individual jars on a processing line. It employs a microswitch that is activated by each container as it passes a given point on the line. This switch then operates the pumping mechanism that delivers the required amount of emulsified spice oil into the jar.

It is considered to be the answer to many flavoring problems. For instance, in the case of process-type pickles, the desired spice-oil mixture can be added into each jar of pickles, followed by addition of hot brine and immediate closing, thus assuring uniformity of flavor and curbing losses of volatiles during processing. The plant-size unit is manufactured by C. W. Logeman Co., Brooklyn.

End (Resume reading on page 88)

Flavor Evaluation

—Continued from page 86

the standard, either by the "duo-trio" procedure, or any one of a number of similar discrimination technics. For years one of the country's leading distillers has used this method in quality control of production.[8]

References:

1. Mildred M. Boggs and Helen L. Hanson, "Analysis of Foods by Sensory Difference Tests." *Advances in Food Research*, II, 222, Academic Press, 1949.
2. David R. Peryam and VeNona W. Swartz, "Measurement of Sensory Differences." *Food Technology*, IV, 390-95, 1950.
3. David R. Peryam, "Quality Control In the Production of Blended Whiskey." *Industrial Quality Control*, 8, 17, Nov. 1950.
4. *Committee on Food Research Progress Reports on Project No. FA-1* (P-301), Report Nos. 1-4. Quartermaster Food & Container Institute, Chicago. (Restricted publication).

The above article is a report of research by the QM Food & Container Institute for the Armed Forces, designated Paper 292. The opinions expressed are those of the authors and are not to be construed as necessarily reflecting the views or constituting the endorsement of the Department of Defense.

End (Resume reading on page 87)

Here's what IN-PLANT CHLORINATION can do

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April 4, 1949

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Newark 1, New Jersey

Gentlemen:

We have been using In-Plant Chlorination for a few years, and feel that this piece of equipment is just as important in a canning factory as any other piece of equipment used in the processing of canned foods.

The first year we installed In-Plant Chlorination we had chemists make bacteria counts, and checks at approximately fourteen points throughout the plant, such as picking table belts, flume systems, washers, blanchers, fillers, closing machines etc. In making these tests we did not use In-Plant Chlorination for one week, and the next week we used In-Plant Chlorination in order to make comparisons as to bacteria count.

The reduction in bacteria count, between the two operations is almost unbelieveable. We found that by using this equipment properly, and increasing the dosage at clean-up time, we eliminated bacteria at many of the check points. One cannot, however, install In-Plant Chlorination and forget about a good housekeeping job. This would be an error, indeed.

However, by having In-Plant Chlorination, and doing a good job of house-cleaning, one can eliminate the building up of bacteria in most any piece of equipment. We do find that by using In-Plant Chlorination the clean-up time necessary at clean-up periods is practically cut in half.

You may use this letter in part or in full - for any purpose you care to.

Yours very truly,

BAKER CANNING COMPANY

By

RDB:eml

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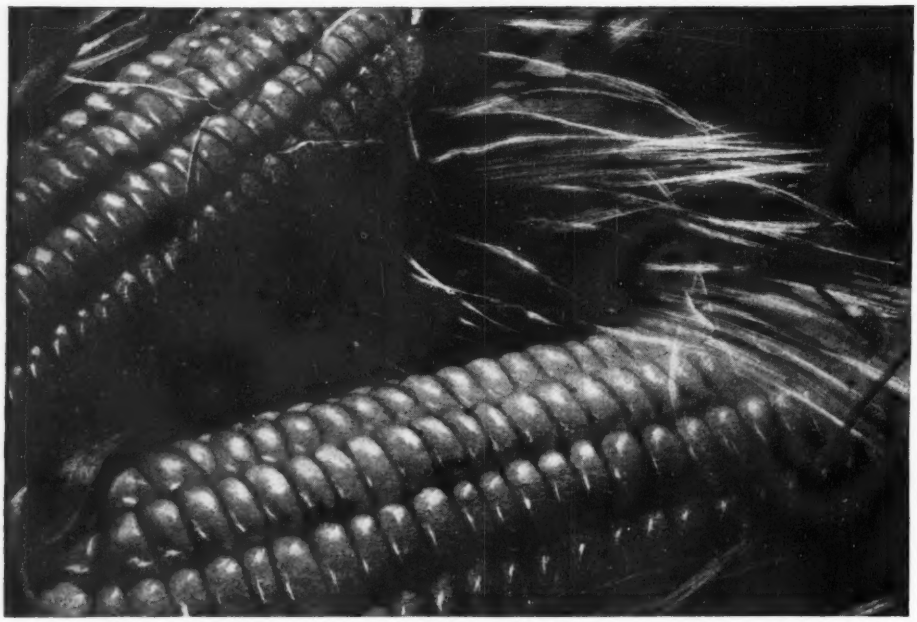
I-33

How to make good foods better



FOR GRITS . . . FOR MEAL. Corn meal and grits have long been American favorites. Today you know that these fine foods have only small amounts of certain vitamins and other nutrients essential to human health. Moreover, degermed meal and grits unavoidably lose some of this essential nutritive value in milling. Now, by the simple, scientifically-proven means of enrichment you can restore important vitamins and minerals (or increase them in whole corn meal which is naturally low in niacin and iron). When you make your products better nutritionally you are "Making A Good Food Better"*, and you are helping to protect the health of a large number of the nation's people. Remember: better products have a better chance to sell better.

QUICK FACTS ABOUT ENRICHMENT

The requirements for various vitamins and minerals to meet Federal Standards of Identity for **ENRICHED** Corn Meal and Corn Grits are as follows. Figures represent milligrams per pound. Levels must not fall below 85% of minimum figures after a specific rinsing test described in the Federal Standards of Identity.

Thiamine (B_1)	2.0- 3.0
Riboflavin (B_2)	1.2- 1.8
Niacin	16.0-24.0
Iron	13.0-26.0

Calcium, 500 mg.—750 mg. per pound and vitamin D, 250 U.S.P. units—1,000 U.S.P. units per pound are permissible additions to enriched corn meal and grits.

** The title of a color film on the enrichment of corn meal and grits produced by Clemson Agricultural College. This film is widely recognized as an outstanding educational film on food and nutrition and is being shown by many health departments and schools.*

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VITAMINS FOR ENRICHMENT

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ADVANCES IN TECHNOLOGY

Flavor and Keeping Quality of Dried Milk Influenced by Preheat Temperature

The critical preheat temperature for whole milk to be dried lies between 160 and 170 F., although 140 F. for 20 min., is sufficient to destroy lipase activity. This indicates that there is some connection between oxidized flavor and oxidizing enzymes which are not destroyed when milk is heated to 160 F. for 20-30 min., yet are destroyed at 170 F.

Experiments were conducted at the State College of Washington with whole milk samples preheated for 20 min. at 140, 150, 160 and 170 (also not preheated), condensed to 40 percent total solids, then spray dried in air at 255 F. Samples of the dried milk were packed in No. 2 cans, sealed and stored at 45 and 85 F. Other samples were double nitrogen packed and stored at the above temperatures.

Lipase activity of raw and condensed milks was determined. Flavor and free fatty acid determinations were made on powder samples after 2 weeks, then monthly for 6 months, and, finally, after 8 months. Flavor was also determined on samples with no preheat, 160 and 170 F. after 12 months.

All samples made from milk having no preheat developed rancidity while in the pan. Those treated at 140 F. or higher did not show any rancid flavor during 8 months storage. However, oxidized and stale flavors developed in all but the 170 F. preheated samples. At the end of 1 yr. storage, powder made from 170 F. preheated milk and stored in air-pack at 45 F., had lost its heated flavor and was slightly superior to the same sample when fresh, as well as that packed in nitrogen.

Digest from "The Keeping Quality of Whole Milk Powder. I. The Effect of Preheat Temperature of the Milk on the Development of Rancid, Oxidized and Stale Flavors With Different Storage Conditions," by L. J. Christensen, C. W. Decker, and U. S. Ashworth, *Journal of Dairy Science*, 404-11, May, 1951.

Dried Sweet-Cream Buttermilk Improves Bread Loaf Volume

Roller or spray-dried sweet-cream buttermilk, when used in breadmaking in an amount comparable to dry nonfat milk gives consistently greater loaf volume than the latter. This is apparently due to the presence of a greater percentage of fat and fatlike substances in the buttermilk.

These facts were demonstrated in a series of experiments conducted to secure information on baking quality of sweet-cream buttermilk powder, and effect of (a) variations in storage and processing conditions, and (b) presence of neutralizer on these qualities.

Results of the experiments indicate that: (1) Non-fat dry milk containing 0.17 percent added soybean lecithin will produce loaves having the same volume as those made with powdered buttermilk, (2) Baking quality of powders deteriorates with storage, the rate increasing with increase in moisture content and in storage temperature, (3) Additional preheating of buttermilk does not affect breadmaking quality, and (4) Neutralization of ripened buttermilk to 0.1 percent acidity before drying has no deleterious effect.

Digest from "A Comparison of Dry Sweet Cream Buttermilk and Non-Fat Dry Milk Solids in Breadmaking," by J. V. Reger, W. B. Combe, S. T. Coulter and R. B. Koch, *Journal of Dairy Science*, 136-44, Feb. 1951.

Moisture Content of Dried Egg Reduced by Quick Cooling

Prompt and rapid cooling of spray-dried egg is the novel feature of apparatus recently patented for minimizing moisture absorption. The dried material is discharged from a cone into an inclined cooling conveyor casing in which a screw carries the powder upward through the housing. A duct is positioned above and to one side of the housing, and is provided with a series of nozzles that directs blasts of cold air against the material. The powder is thus repeatedly subjected to blasts of cold air while being mechanically conveyed. Spent cooling air is exhausted through a filter element. Cooled powder is discharged into a cone connected with a vibrating screen which, in turn, delivers to a filling machine.

By employing refrigerated air of low moisture content to cool the powder discharged from the spray cone, it it possible to reduce the operating temperature of the latter by 40-45 deg. and increase the liquid input by 30-35 percent. The final product will have a moisture content of 0.5-2.5 percent.

Digest from U. S. Patent 2,531,343, issued Nov. 21, 1950, on an application dated Dec. 11, 1944, to William J. Patterson, La Grange, Ill., assigned to Swift & Co., Chicago.

DAIRY

To Pasteurize Chocolate Milk —More Heat or Longer Hold

The present standard of 160 F. for 15 sec. for the HTST pasteurization of whole milk does not give an adequate margin of safety when applied to chocolate milk. However, a temperature of 165 F. for 15 sec. appears to be ample.

Laboratory studies were made to measure the heat treatments required to effect 99.99 percent destruction of *M. freudenreichii* in various chocolate milk mixes and in whole milk. (Mixes contained 0.0555-0.07 percent stabilizer, 5-8 percent sugar, 1 percent cocoa, 3.25 percent fat.)

Plant studies were made with a commercial plate pasteurizer, and reduction of total bacterial counts were used as indices of pasteurization efficiency. (Mixes contained a commercial non-

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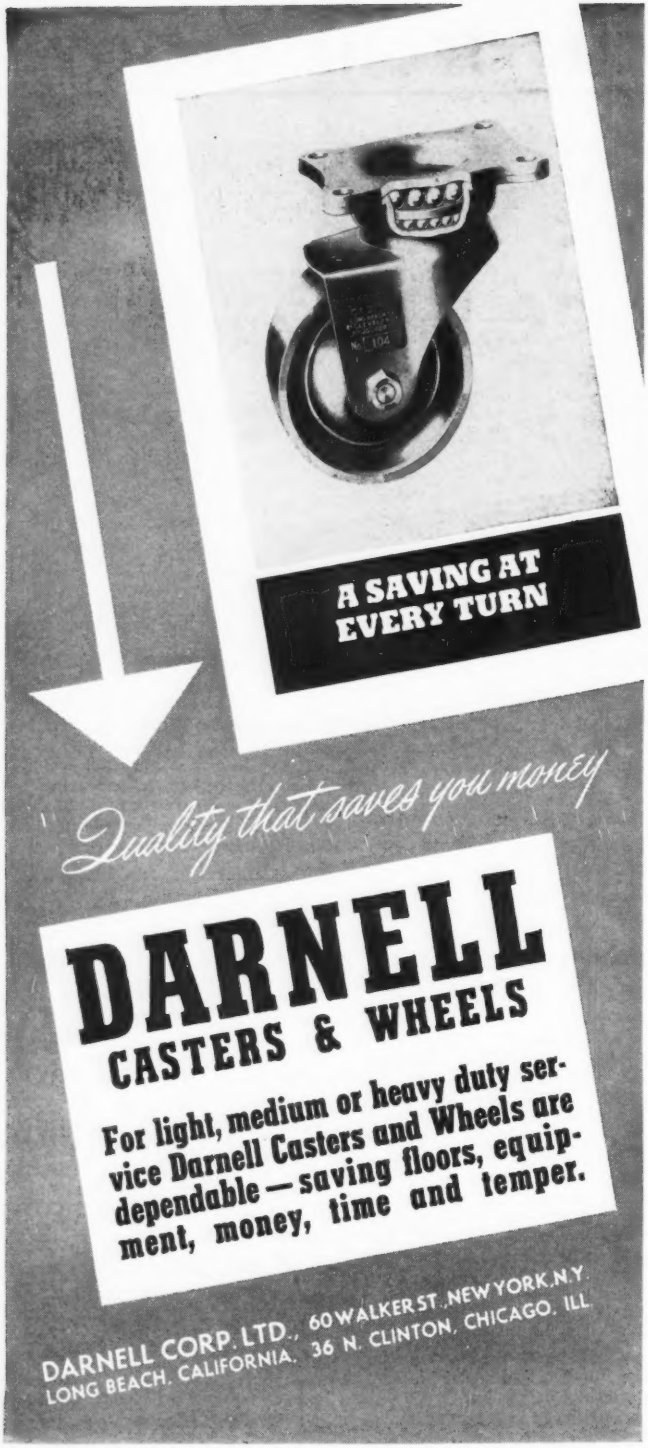
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settling cocoa preparation, or 0.9 percent American cocoa plus stabilizer to give a viscosity of about 8 centipoise, 5 percent sugar, 2.5 percent fat.)

HTST pasteurization of chocolate mixes at 161 and 168 F. for 19 secs. in the plant gave bacterial reductions comparable to laboratory pasteurization at 145 F. for 30 min., and at 175 and 168 F. for 40 sec. gave a somewhat greater destruction and an improved body.

An equation is presented for predicting minimum pasteurization times for whole and chocolate milks of various non-fat-solids contents over a range of temperatures from 143-165 F.

Digest from "Some Observations on the High-Temperature Short-Time Pasteurization of Chocolate Milk," by M. L. Speck and H. L. Lucas, *Journal of Dairy Science*, 333-341, April, 1951.

CONFECTIONERY

Spoilage of Chocolate Can Be Minimized

Storage of chocolate coating calls for optimum conditions of temperature and relative humidity. Too low a temperature is not only needlessly expensive, but causes the chocolate to become brittle. Furthermore, condensation may occur and the condensate may promote mold growth to the detriment of flavor and appearance.

The optimum range for these conditions is 50-55 percent relative humidity at 50-55 F. Slight variations in either direction may be tolerated, but storage conditions should be as uniform as possible.

Improper handling in the tempering and application of chocolate results in unsightly appearance and poor physical condition. Among the abuses that should be avoided are: (1) Overheating when remelting; (2) too much mixing of air, causing frothy coating and high viscosity; (3) too long holding of tempered coating; (4) recirculation of too much chocolate in a well tempered condition; (5) too rapid tempering or too advanced state of tempering, giving livery consistency; (6) introduction of vegetable oils and hard fats which adversely affect the characteristics of cocoa butter; and (7) too rapid chilling, producing surfaces showing cocoa fat bloom; or too slow chilling, causing grainy cocoa butter crystal patterns.

Cocoa powder also requires careful handling because it is an active absorbent of moisture in proportion to the relative humidity of the air to which it is exposed. Fat-free powders absorb moisture rapidly, suggesting that the fat content is protective. Alkali-process cocoas, however, are

more hygroscopic and will have higher moisture content after reaching equilibrium than a natural cocoa of the same fat content.

Digest from "Use and Abuse of Chocolate," presented before N. Y. Chapter of American Assn. of Candy Technologists, by W. T. Clarke, Rockwood & Co., Brooklyn, N. Y., March 14, 1951.

Conditions Melted Chocolate

Instead of relying on contact with cold surfaces to cool melted chocolate that is to be used for dipping and like operations, a recently patented method and apparatus allows the chocolate to fall in small streams through circulating refrigerated air.

The apparatus comprises a series of water-jacketed receptacles, one above the other. Melted chocolate is pumped into the uppermost receptacle, from the bottom of which it flows in a multiplicity of small streams into the receptacle below. The section of the apparatus between receptacles is part of a system of circulating refrigerated air through which the melted chocolate must fall. A drop of 10 deg. can readily be obtained in the first air space, and a similar drop in the second.

The lowermost receptacle contains a stirring device to maintain the chocolate in homogeneous condition as it is pumped to the point of use. More than two stages of cooling can be used, although two will usually suffice. Temperature of the cooled chocolate may be raised a few degrees in the final receptacle or in the discharge pipe leading therefrom.

Digest from U. S. Patent 2,531,773, issued Nov. 28, 1950, on an application dated Feb. 11, 1946, to F. W. Greer, Belmont, Mass., assigned to J. W. Greer Co., Cambridge, Mass.

FRUITS AND VEGETABLES

Fruit and Vegetable Slices Firmed by Calcium Salts

Improving the consistency of processed fruit and vegetable products is the object of two recently patented processes. In one the fruit is treated with an aqueous solution of a calcium salt; in the other, with an aqueous solution of pectase, with or without added calcium salts.

In applying the process, blanched apple slices are cooled by dipping in, or spraying with, a solution of calcium chloride, calcium acetate, or calcium gluconate in concentrations of from 0.2 to 2.0 percent. If a more pronounced firming is desired, an alkaline buffer is added to the calcium solution. Appropriate buffers are sodium acetate, disodium phosphate, or sodium carbonate.

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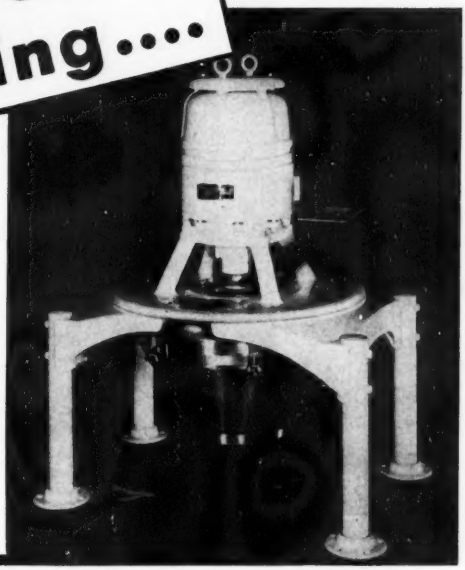

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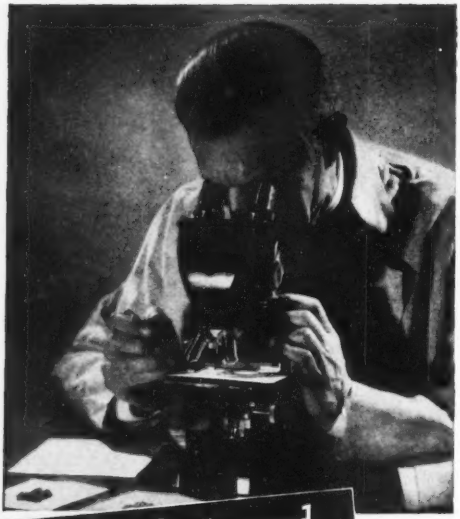

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In the treatment of fruit and vegetable slices with a pectin hydrolyzing agent, particularly the enzyme pectase, the material is soaked in an aqueous solution of the enzyme long enough to impart the desired degree of firmness. The most favorable pH for the operation is 3.8 to 6.0. Time of treatment may be reduced by processing at an elevated temperature or under reduced pressure. The beneficial effect can be enhanced by the addition of calcium salts.

Digest from U. S. Patents 2,531,431 and 2,534,263, issued Nov. 28, and Dec. 19, 1950, on applications dated Jan. 30, 1948 and July 18, 1947, respectively, to Claude H. Hills, Philadelphia, Pa., assigned to the USA.

STORAGE

Compounds of Chlorine Stop Final Decay

Prevention of fungal and bacterial decay in fruits and vegetables during shipment and storage is the object of a patented treatment with solutions of chlorine per se or hydrolyzed to hypochlorous acid, and chlorinated organic amino compounds. In the practice of the invention chlorine is added to the customary washing solution to the extent of 10-400 ppm. About 10-50 percent of this quantity is present as free chlorine and the remainder as a chlorinated organic amino compound. The total chlorine content is controlled to accord with the concentration tolerance of the fruit or vegetable and the type of decay to be inhibited. In most cases the preferred range is 25-75 ppm. of which less than ½ is present as free Cl. Temperature of treatment may range between 32 deg. F. to that of tap water, and in general the pH of the solution is that of the latter. Cl is consumed in the operation and the solution must be regenerated. A variety of organic amino compounds may be used.

Digest from U. S. Patent 2,531,463, issued Nov. 28, 1950, on an application dated July 2, 1948, to D. E. Pryor, Whittier, and J. C. Baker, Monrovia, Calif., and assigned to Wallace & Tiernan Products Corp., Belleville, N. J.

Improved Air Circulation Speeds Fruit Cooling

Two departures from conventional room-cooling of fruit—tunnel cooling and high-velocity cooling—have been studied experimentally, and cooling rates have been determined and compared. Both methods promise improved performance over present room-cooling practice. The data are presented in the experimental stage in the hope that they will be of value to designers in working out practical application of the methods.

To test the tunnel-cooling system, pallet loads of fruit were placed in a tunnel and exposed to air at a velocity of 300-800 fpm. With such an arrangement, cooling was accomplished 1½-6 times faster than in a room, the advantage varying with the commodity, type of package, and air velocity.

The other system proposes an arrangement wherein a high-velocity stream of cold air is directed downward on the open face of the packaged commodity. Here, cooling rates are 9-40 times faster than room-cooling of the same product. Again the advantage varies with the commodity, type of package, and air velocity.

Economical application of either system will depend on the ingenuity of engineers in designing handling systems requiring minimum space, investment, and labor.

Digest from "Improved Fruit Cooling Methods," by G. F. Sainsbury, *Refrigerating Engineering*, Vol. 59, 464-69 and 506-9, May, 1951.

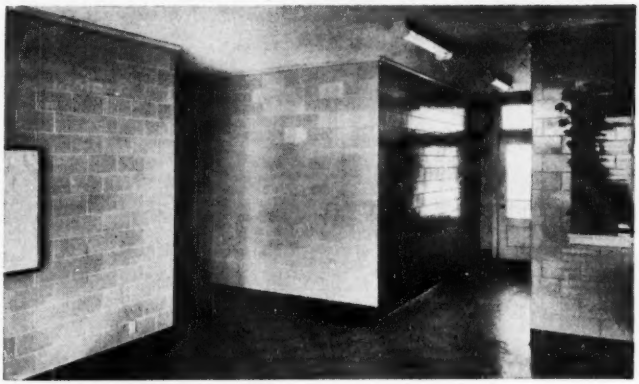
ENGINEERING

Improved Malt Kiln

Construction difficulties in Central Europe have stimulated development of less expensive types of malt-kiln construction. A recent type, first operated experimentally in 1950, is the Huber system, which requires only two floors and no chimney, the draft being supplied by a blower in a room adjacent to the hot-air distribution room. Green malt is charged into a perforated-floored compartment on the second story. Heated air passes through the layer of green malt, drying it, and then escapes through louvres and windows in the kiln room.

Heat is supplied by circulating superheated water in a system of radiator pipes in one wall of the lower hot-room and a second set of pipes arranged horizontally about 14 in. below the perforated ceiling, which is also the floor of the malt compartment. Louvres of sheet metal cover the ceiling pipes and protect them from falling sprouts, as well as distribute the air supply evenly. Hot water comes from the plant boiler system, any boiler operating at more than 75 psi. being satisfactory for the purpose. Connections are made well below the low-water line, and a circulating pump forces the water through the heating pipes and back to the boiler. The blower supplying the draft can take air through a twin duct system from either the kiln area above the drying malt, or from the outside. Relative humidity can therefore be accurately controlled as well as temperature. The kiln is independent of the weather,

Lobby walls of KRAFTILE at the Aluminum Co. of America offices (Reconstruction Finance Corporation plant) Riverbank, California



Now—CUSTOM-MADE Walls at STOCK-MODEL Prices *with*

KRAFTILE Industrial Wall Units

Need a wall finish that meets any or all of these special requirements?

1. Never requires painting
2. Sanitary, easy to keep clean and sterile
3. High resistance to scuffing, marring
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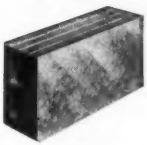
7. Acid or alkali-resistant

You can get it with KRAFTILE glazed industrial wall units. In fact, you solve two problems at once—selection of the structural wall material and of the finish—when you specify KRAFTILE.

These glazed "building blocks" are serving Western business and industry in washrooms, laboratories, processing rooms, corridors and offices.

It will pay you to investigate KRAFTILE before you build or remodel...the attached coupon will bring complete information, promptly.



THIS IS A GLAZED STRUCTURAL WALL UNIT—a structural clay tile with a fired-on glazed surface on one or both sides. Available in clear glaze or in attractive colors...a "pre-finished" wall material with these important advantages:

★ **ONE-CRAFT INSTALLATION**—when the mason lays it up, the wall's *finished*—no lathing, plastering, painting!

★ **LIFETIME ATTRACTIVENESS**—never needs painting, can't fade, highly resistant to scratching and scarring. Pencil, crayon, lipstick, grease marks wipe off easily. Unaffected by water, steam, most acids, alkalis.

★ **DESIGNED FOR SIMPLE ERECTION**—wide range of shapes in modular dimensions permits fast installation with minimum of cutting and fitting on the job.

★ **PERMITS STEEL-SAVING REINFORCED MASONRY CONSTRUCTION**—approved installation methods and reinforced masonry will meet earthquake code requirements, use less steel than reinforced concrete!

KRAFTILE CO., Niles, California

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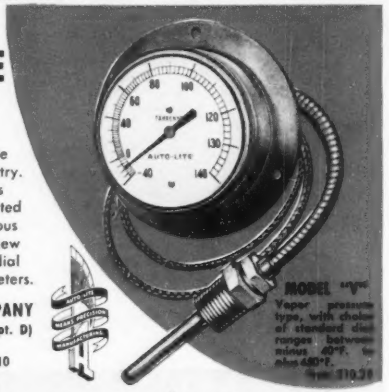

Model "V" is one of many Auto-Lite dial thermometers made for industry. The outline drawings show how this temperature indicator can be adapted to meet specific needs through various standard mountings. Send for our new Catalog No. G-143-B of Auto-Lite dial indicating and recording thermometers.

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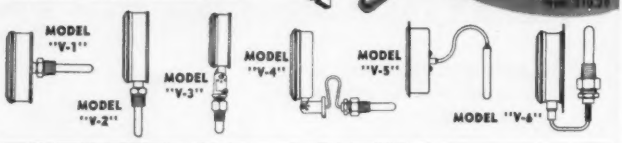

heart of the strainer

A high-grade, woven Monel wire screen is the heart of the Yarway Strainer—one reason why hundreds of thousands of these strainers are policing pipe lines in nearly every industry.

OTHER REASONS—

- cadmium plated bodies and screen caps
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- ten sizes from ¼" to 3"

Sold by 216 industrial distributors. Write for Bulletin S-203.

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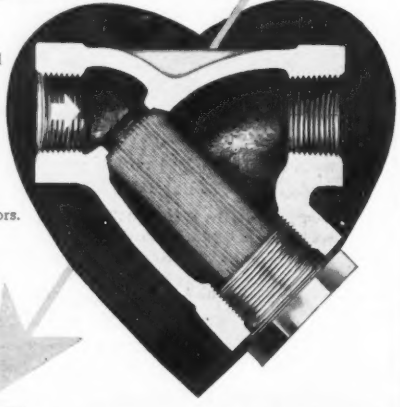

YARWAY STRAINERS

and readily adaptable to production of any type of malt.

Since the stack gases do not come into contact with the malt, any type of fuel may be used. Because of the recirculation of air and the return of partly cooled water to the boiler, thermal economy is high. Other economies are realized by: Not using turning equipment in the malt compartment; the smaller amount of labor required for general operation, and the increased capacity per unit of area, obtained in part by faster drying, as well as by thicker layers of green malt on the floor. The plant is much cleaner, and malt sprouts are recovered more easily than from conventional kilns.

Digest from "The One-Screen High-Pressure Hot-Water Kiln, Huber System," by George Bärlehner, *Brauwelt*, 2-4, Jan. 4, 1951.

MISCELLANEOUS

Solubility of Sucrose In Glycol Varies With Water Content

Glycerol and propylene glycol are often components of sucrose syrups used as flavor concentrates. Consequently, solubility of sucrose in aqueous solutions of these products is of considerable interest. At 77 F., a saturated solution of sucrose in water contains 67.89 percent sucrose by weight or 90.6g. per 100 ml. of solution. A saturated solution of sucrose in glycerol contains 7.2g. per 100 ml., and in pure propylene glycol, 2.0g. per 100 ml. The change in solubility in both glycols in aqueous solution is essentially linear with the concentration between 25 and 100 percent. At 25 percent glycerol by weight 78.2g. of sucrose is dissolved in 100 ml. of solution. A 25 percent propylene glycol solution will dissolve sugar up to 75.7g. per 100 ml. of solution.

Digest from "Solubility of Sucrose in Aqueous Glycerol and Propylene Glycol," by M. W. Fey, C. M. Weil, and J. B. Segur, *Industrial and Engineering Chemistry*, 1435-36, June, 1951.

Metabolites of Nicotinic Acid Formed from Tryptophane

Determination of the rates of excretion of N-methylnicotinamide and N-methyl-2-pyridone-5-carboxylamide in human urine after ingestion of tryptophane has shown no great variability in the rate of excretion of either metabolite; and that the excretion of pyridone was more constant than that of N-methylnicotinamide. The rates of excretion of both metabolites, however, were higher in all 8 periods of the test than in the corresponding controls. The conversion

(*Turn to page* 179)

There's only one
TAPER-LOCK

Precision-Grooved

True Running

Easy on—Easy off

TAPER-LOCK bushing grips the shaft for the full length of the bushing — holds sheave with firmness of a shrunk-on fit. No wobble. Taper-Lock runs true!

No flange—no collar—no protruding parts. Flush machine-tool appearance.

Finest grade of close-grained semi-steel, cast in the Dodge foundry.

The grooves, machined on precision equipment, have identical pitch diameters. This insures equal belt tension. Every belt pulls its share of the load!

TAPER-LOCK sheaves are available from distributors' stocks in complete range of sizes in A, B, C and D grooves.

DODGE SEALED-LIFE BELTS have special protection for tension members, insuring longer belt life. Perfectly matched to TAPER-LOCK sheaves.

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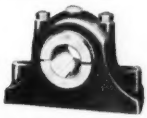
FIRST IN POWER TRANSMISSION MACHINERY!

V-BELTS AND TAPER-LOCK SHEAVES



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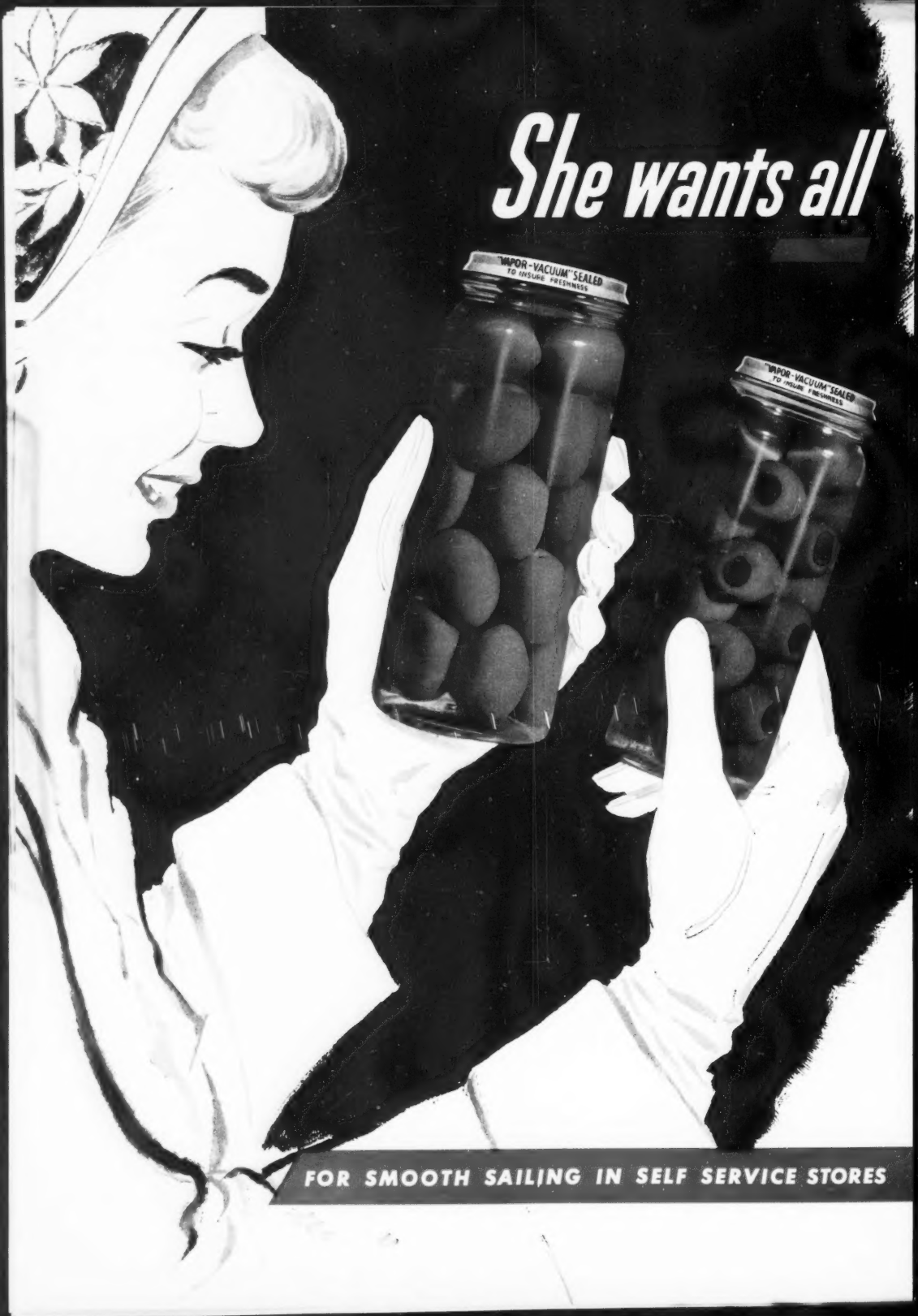
ROLLING GRIP AND DIAMOND D CLUTCHES

SOLID STEEL CONVEYOR PULLEYS


She wants all
"VAPOR-VACUUM" SEALED
TO INSURE FRESHNESS
"VAPOR-VACUUM" SEALED
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There's nothing the self-service shopper likes better than a package which tells her instantly and visually all about the size, style, color, etc. of its contents. Consider, for example, the way a shopper's mind works when her eye lights on a Glass + Vapor-Vacuum package . . .

When you make love to a shopper, via your package, there's one form of wooing you can always count on for results.

You can be sure that the shopper's eye will light up and her resistance will fall *whenever you make it easy for her to see exactly what is in that package of yours.*

Complete frankness in packaging is a trait which shoppers love! It wipes out suspicion. It speeds decision. It stimulates the buying impulse.

Let them speak for themselves

Frankness in packaging pays out particularly when the shopper is faced by a choice between a package which *hides* its contents and another which *reveals* them.

Every day millions of shoppers, facing this choice, are reaching out for the packages which let their contents speak for themselves. *They are buying what they can SEE.*

That's why we Vapor-Vacuum people keep saying that one of the most powerful forces for building self-service sales is *visible packaging—via glass plus Vapor-Vacuum.*

By the billions . . .

The proof of this principle is the simple fact that the cash registers of America's food stores ring up sales of Vapor-Vacuum sealed foods *many millions of times per day.* What's more, this happy jingling of the cash register keeps right on growing more frequent.

Our packer friends and we never stop planning and working together to expand the uses of visible packaging and Vapor-Vacuum sealing.

And while this interesting process goes on, let no package planner forget that the finest of all ways to make SEEING help SELLING is the Vapor-Vacuum way.

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PRODUCT OF **WHITE CAP CO.**, CHICAGO

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If you want to make it easier to get peak efficiency from your International Trucks in an uncertain future, get your free Truck Saver Inspection now.

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So if you want to protect yourself, make an appointment with your International Truck Dealer or Branch. Get your Truck Saver Inspection, get complete details on how the complete new International Truck Saver Plan can save you time, trouble and money.

Look what the complete International Truck Saving Plan offers

The complete International Truck Saver Plan has been developed by experts, after a thorough study of today's truck operating problems. It offers these benefits to International Truck operators:

1. Better performance over a longer truck life: trucks are kept in shape to do the most efficient job possible until they can be replaced by new units.

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Start getting your Internationals in top shape for the future

Thousands of International Truck owners have already begun putting the International Truck Saver Plan to work for them.

Call your International Truck Dealer or Branch and arrange for a free Truck Saver Inspection. You'll get complete information on how the plan can keep your trucks rolling at peak efficiency.

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of tryptophane to nicotinic acid appears to have commenced within 3 hr. after ingestion. Comparison of results obtained in this case with those of another indicate that there may be great variability between apparently healthy individuals in the rapidity of conversion of tryptophane to metabolites of nicotinic acid.

In another study of the effect of amino acids other than tryptophane on the human metabolism of nicotinic acid, the subjects were given a relatively large dose of a tryptophane-free protein hydrolysate. No increase in the levels of excretion of the metabolites of nicotinic acid occurred after the dose, but there was a slight, but consistent, fall during the 4th of 8 periods of the test, suggesting that the amino acids have a suppressing effect on nicotinic acid metabolism.

Digest from "Role of Tryptophane and Other Amino-Acids in the Metabolism of Nicotinic Acid by Humans," by W. I. M. Holman and D. J. de Lange, *Nature*, Vol. 166, 468-69, Sept. 16, 1950.

Freezing Fish at Sea To Lessen Spoilage

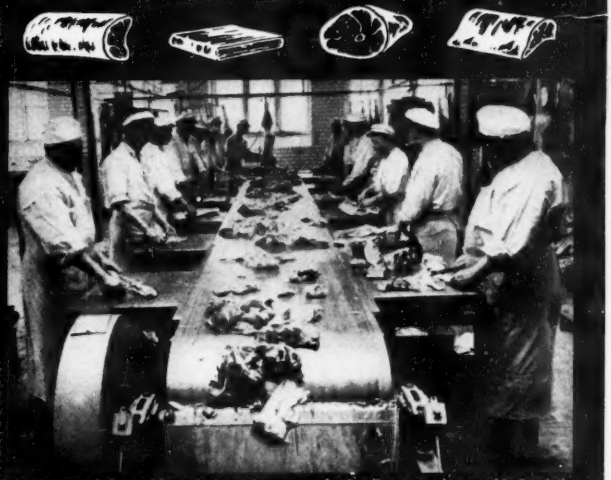
Types of bacteria that contaminate fish and shell fish are resistant to ordinary refrigeration temperatures, and consequently the "keeping time" of these products under non-freezing refrigeration is relatively short. This being true, it is evident that spoilage can be kept at a minimum only by promptly freezing fish when caught and storing them at below zero F.

Careful icing of fish when caught can accomplish the purpose for a time, but unfortunately this is not always effectively done. There remains then the prospect of controlling spoilage by freezing when caught and storage at low temperatures.

The Fish & Wildlife Service has under way a "Freezing-Fish-At-Sea" project by which it hopes to enable the fishing industry to market "sea fresh" fish. A trawler has been equipped to preserve fish by conventional icing and by freezing, so that the two methods can be compared. If "freezing" can be successfully applied it will have many advantages: There will be no question of freshness as at present when fish are held in ice for 8-10 days; the vessel can remain on the fishing grounds until it has a full load; liver and other valuable material now discarded at sea can be brought ashore for conversion; and shore plants will be able to operate on a fixed work schedule. Above all is the advantage fish will be of uniform high quality.

Digest from "Control of Fish Spoilage by Icing and Freezing," by H. E. Crowther, *Commercial Fisheries Review*, Vol. 13, 6-10, March, 1951. —*End*

This Pork Production Line Uses A SANDVIK *Steel-Band* CONVEYOR TABLE



Cutting up of dressed hogs is a continuous production-line operation on this Sandvik work table. Sides are sawed into large cuts at far end of conveyor and each man along line performs a specific subsequent operation.

CONVEYING WORK TABLES OF COLD-ROLLED STAINLESS STEEL IMPROVE PROCESSING OF MEAT, FISH, VEGETABLE AND BAKERY PRODUCTS

You can apply cost-cutting, mass production methods to your operation with a Sandvik conveying table.

Right now, Sandvik work tables are minimizing costs in operations such as bacon and frankfurter packing, chicken eviscerating, hamburger preparation, tenderizing, cake-icing and packing, ham-boning, pork rolling, fish fileting and packing, vegetable, fruit and nut sorting, etc.

Here are some reasons why:

- **EASY TO KEEP STERILELY CLEAN**—Live steam or boiling water can be applied directly.
- **NO TASTE CONTAMINATION**—A hard, smooth surface . . . no place for food particles to lodge.
- **LONG SERVICE LIFE**—High strength and resistance to time and wear.
- **ENGINEERED TO FIT APPLICATION**—Lengths to meet any requirements.

Standard work table widths are 20" and 12", but special widths are also available. Correct working height can be arranged despite special floor conditions. Special, custom-built units also available.

Sandvik provides a complete engineering service . . . proposal, design, installation and follow-up.

For further information contact

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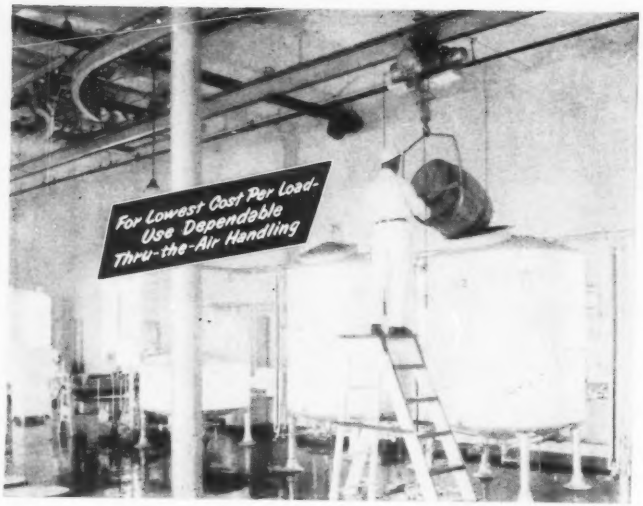

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WHAT are *your* problems? Under WHAT conditions will *your* hoist be operated—intermittently, or under fairly constant conditions? WHAT are the operating speeds necessary to meet *your* productive cycle?

Your answer to these and similar questions will enable us to engineer your installation so that it will give you the best, and longest service—at the lowest cost per load over the years.

Be sure you get the hoist installation best qualified to do *your* job. It's wise—and costs you nothing—to get the facts first, rather than to make expensive changes later.

May we place our experience of a great many years of successfully designing all types of hoist installations at your disposal?

Shepard Niles

CRANE & HOIST CORPORATION

Makes and sells all three lifting tools for airborne shop loads

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Effectiveness of Warfarin

—Continued from page 69

ness nor tolerance is developed by the rodent; it is reasonably safe because of the low recommended concentrations and the prolonged feeding period necessary to effect the kill; secondary poisoning is unlikely unless large numbers of Warfarin-poisoned rodents are eaten over a period of time; and it is very effective in most instances.

However, Warfarin is slow acting. It takes 5 to 8 days to kill Norway rats, 5 to 20 days for roof rats, and, for house mice the maximum time may be 30 days. To be effective, the rodent must eat Warfarin-poisoned food regularly within a 10-day period, with no interval greater than 48-hr. between feedings.

Trapping May Still Be Answer

As a hypothetical case, let us assume that all rodents infesting a specific plant are completely exterminated in a week's time, and also that all their contamination is completely removed (a costly and difficult job). The source of food contamination has thus been eliminated—but one, or a pair, of rats or mice may again enter. And if Warfarin is used, another minimum 5-day period of plant contamination occurs, plus the exhaustive plant clean-up. An so *ad infinitum*.

Where poisons are permissible, rapid acting ones are to be preferred. (The state health department of California prohibits use of any toxic poison in a food plant where it might contaminate foods. Warfarin is no exception to this law.) Rodents eat poisons only when they are included as "riders" in baits. They will eat any given bait if they like it, or the lures contained therein, but not because they like the poison. An expert exterminator can treat preferred baits with rapid-acting poisons in a manner lethal to rodents. Or he can, in many cases, trap all rodents infesting a food plant.

Failures with rapid-acting poisons or traps are principally human rather than material failures. The same human factor holds true in use of Warfarin as with other materials or methods. Insufficient bait quantities, improper placement, poor choice of baits, and infrequent bait changes are some of the human errors that defeat rodent-poisoning programs.

Any exterminator who knowingly allows the plant to become contaminated for 5 to 30 days, or longer, by routinely using a slow-acting poison, has failed to properly assist management.

This is not intended to discourage

the use of Warfarin in selected situations. It should be strongly considered for rodent extermination wherever the time necessary to kill is of secondary importance. Many examples of its potential use could be given, such as control of outside areas, around box stacks, in non-food warehouses, on farms and in fields, and in general community rodent killing projects.

The prerequisite for the prevention of rodent contamination in food processing and packing plants are: Reduction of accessible food and shelter for rodents through proofing methods, protected storage, rapid extermination as rodents may enter, and regular, thorough plant cleanups.

Bibliography

Walter K. Dykotra, "New Techniques and Developments in Rodent Control," *Pest Control*, Dec. 1950.

"Warfarin for Control of Rats and Mice," *Modern Sanitation*, 45-46, Nov. 1950.

Robert J. Dicke, "Sources of Insect and Rodent Contamination in Food Processing Industries," *Pest Control*, Oct. 1949.

End (Resume reading on p. 70)

Readily Made Fondant

—Continued from page 101

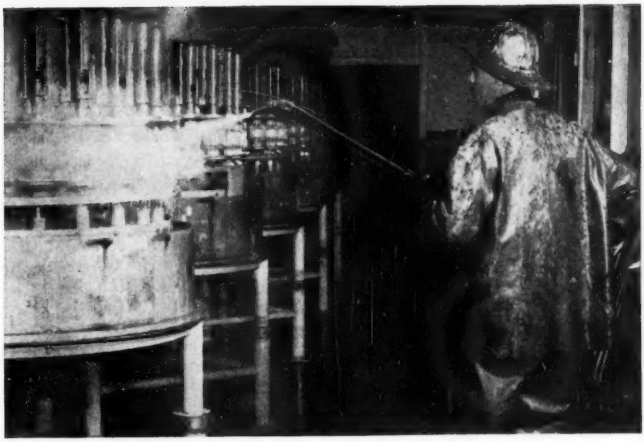
The fondant falls from the creaming scroll into the saw-roll unit. The paste first passes through two rapidly rotating rolls, operating at different speeds and set only a few thousandths of an inch apart. A set of gang saws immediately under the rolls shreds the ribbon of fondant into tiny particles, each of which is composed of a myriad of microscopic sugar crystals. At this point, the product resembles sawdust.

Passing from the saw-roll unit, the fondant is then carried through two tray-type vibrating dryers (Photo C). Air passes through the dryers countercurrent to the flow of sugar. Two objectives are accomplished: Water is removed and the temperature of the Drivert is reduced.

After the product is dried, it is screened by a Rotex rotating unit, with the coarse particles remaining diverted for re-use. The finished screened product is then packed in multi-wall paper bags.

To maintain Drivert in a free-flowing condition, it is first essential to eliminate as much moisture as possible and then to protect the product from subsequent absorption of moisture. An asphalt-laminated ply is incorporated in the bags in which the product is packed in order to avoid subsequent moisture absorption. Storage of Drivert should be confined to dry, moderately warm locations.

End (Resume reading on p. 102)



Slash hours off cleaning time throughout your plant

Here's the 481 Oakite Steam-Detergent Gun—the one-man crew that cleans up your entire plant *in half the usual time.*

No tedious scraping or scouring with this dirt-dynamiter. Just a twist of the valve and the gun fuses heat, force, powerful detergent to get under, lift off all bacteria-breeding deposits—no matter how heavy or how hard-to-reach.

Easy to operate, the Gun requires no motors, injectors, pumps. Just 30 lbs. of steam pressure, a couple of lengths of hose, and a solution container—and you've got the answer to your toughest cleaning problems. The Oakite Steam-Detergent Gun can't be beat for cleaning

- Packaging machines
- Blanchers
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- Elevators
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For Economical Freezing At Its Scientific Best—It's

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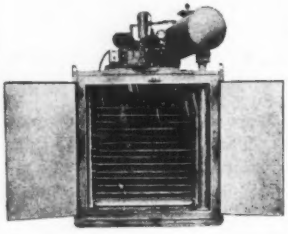
CONTACT PLATE FREEZERS

(Patent Applied For)



Illustrated Model B 15 Stations

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Questions & Answers

How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 18, N. Y.

THIS MONTH'S PROBLEM

Question—A considerable number of complaints are coming to us in respect to the sifting out of our dessert powder from the packages. Our product is filled in bags, which are packed in small cartons. Can you suggest where my trouble might lie?

Answer to June Problem

The Question Was—Recently, we started to vacuum-pack roasted nuts in glass jars. But within a few months white deposits appeared inside the jars. Can you tell us what is responsible for this condition and how it can be avoided?

Answer—Naturally, this condition detracts from the appearance of the product. Often such white deposits are mistaken for mold growth. Actually, however, they are soap.

Generally occurring where nuts are in actual contact with the glass, this soap was formed as a result of a reaction between fatty acid in the nut oil and alkali on the surface of the glass.

Several physical factors aid in the formation of these soap deposits. Among them are high storage temperatures and high moisture content of the nuts themselves.

Washing the jars with water and then drying them prior to filling will minimize the formation of these deposits. Also, use of old glass jars should be avoided.—*Irving S. Fagerson, Assistant Research Professor, Department of Food Technology, University of Mass.*

How to Make Cranberry Sauce

Question—I would like to have formula and details on the manufacture of canned cranberry sauce.

Answer—There are actually two major steps in the manufacture of cranberry sauce—preparing the pulp and cooking the sauce.

To make the pulp, add 6 gal. of water to 45 lb. of washed cranberries in a steam-jacketed kettle, cook at about 180 deg. F. for a sufficient length of time to digest the berries throughly, and run the digested fruit through a screw-type pulper equipped with 0.002-in.-dia. screens.

Now to make the sauce: Into the steam-jacketed kettle add 74.25 lb. of the precooked cranberry pulp and 55 lb. of sugar and cook to 215 deg. F. or a 50-percent refractometer reading. Let the sauce remain in the kettle to permit the air to rise to the surface in the form of a white scum. Remove the scum so that it does not go into the filling line.

Now fill the sauce into cans at 190 deg. F., seal the cans, and cool the sauce immediately. Rapid cooling is necessary to retain the color and flavor of sauce and prevent can corrosion.

Determining Cocoa Fineness

Question—We are looking for a simple, yet precise, method of determining the fineness of the cocoa powder that we use in one of our beverages. In our particular case, the size of the cocoa particles is more important than the effect of the cocoa on the palate.

Answer—Air-separation tests are perhaps the best for evaluating the fineness of cocoa powder, but these methods involve expensive equipment. As an alternate, the size of the cocoa particles can be easily measured with a microscope. Better yet, they can be gaged by this simple method:

Mix 300 mg. of cocoa powder in 5 ml. of petroleum ether and 4 ml. of alcohol. Transfer the mixture to a 144-cm. long glass tube filled with alcohol. Include in the tube a pipette for measuring the volume of settled solids. The time it takes the first ten particles to pass a given point on the tube can be used as a means of comparing the relative size of the largest particle, which falls most rapidly to the bottom of the tube. To determine the relative fineness of the cocoa powder, record the time it takes for the various fractions to settle.

Reverted Flavor Query

Question—What is meant by flavor reversion of soybean oil, and what can be done about it?

Answer — According to present usage, the term "flavor reversion" is applied to the appearance of any undesirable flavor which may or may not resemble that of the unrefined oil. The course of reversion in soybean oil is initiated by the appearance of grassy, haylike and beany flavors that increase in intensity and give rise to fishy and painty flavors in badly reverted oil. Flavor reversion occurs prior to the onset of true rancidity.

Refiners have made considerable strides in overcoming this difficulty. Considerable progress has been made in delaying reversion by giving consideration to the quality and varieties of soybeans, doing away with abusive refining practices, storing the oil in the absence of light, and keeping out certain metals that accelerate reversion.

Recently, it has been found that small amounts of citric acid, when added to soybean oil in the refining process, extend the shelf-life of the oil three to five times. And several commercial refiners are now using this method to make better soybean oil for margarine, shortening, and salad dressing.

Removing Carbon From Pans

Question—In our present system of coating bread pans, we are using grease instead of a silicone resin. Can you tell us if Dowanol DC, the silicone-stripping solvent, can be utilized to remove carbonized material from our pans?

Answer—According to the manufacturer, Dowanol DC is a high boiling solvent which, when used in combination with potassium hydroxide or caustic potash, depolymerizes the silicone molecules in DC Pan Glaze and converts them to potassium salts that can easily be rinsed off pans with water. Its solvent cation, however, will not remove burnt or carbonized grease from baking pans. To remove carbonized grease from tinned or aluminum pans, use suitable alkaline cleaners that will not react with the metal.

Pans that have been both glazed and greased should be degreased with chlorinated solvents or an aqueous solution of an alkaline cleaner. If pans are degreased with solvents, they can be put directly into the Dowanol solution. But if an alkaline cleaner is used to remove the grease, then the pans must be thoroughly rinsed and dried before stripping the silicone glaze.

INDUSTRY IS PROVING DAY "AC" DUST FILTERS

87% OF OUR PRODUCTION IS FOR REORDERS FROM . . .

FIRMS SUCH AS THESE:

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Schlitz Brewing Co.
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. . . and others.

THIS SUCCESS STORY SPEAKS FOR ITSELF

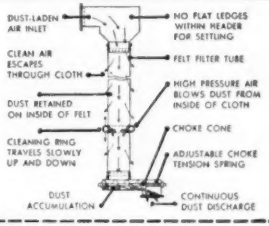
The soundness of the Day Type "AC" Dust Filter principle, effecting outstanding efficiency of operation with minimum maintenance, is verified by industry itself. 87% of our production of Day Type "AC" Dust Filters is channeled to meet the demands of users who are witnessing the results in their own plants—and reordering.

FEATURES OF THE DAY TYPE "AC" FILTER

- **CONTINUOUS-AUTOMATIC OPERATION** . . . the use of slow traveling, reverse jet cleaning rings gives automatic-continuous operation without shutdowns for cleaning.
- **CONSTANT AIR VOLUME** . . . the back pressure of DAY Dust Filters rises slightly when first started, then levels off to assure constant air volume.
- **PARALLEL AIR FLOW** . . . in the DAY Dust Filter, dust and air travel downward together.
- **HIGH AIR-TO-CLOTH RATIO** . . . 10, 15 or even 20 to 1 ratios maintained with uniform back pressures.
- **HIGH CLEANING EFFICIENCY** . . . with reverse jet cleaning, high grade filtering materials can be used because the action is gentle yet positive. Reverse jet rings move up and down, cleaning continuously.
- **NO DUST-CATCHING LEDGES** . . . DAY TYPE "AC" FILTERS, with a pattern of square-to-round inlet fittings, have no flat surfaces where dust can accumulate and become contaminated.
- **OUTSTANDING ADAPTABILITY** . . . units can be furnished with multiples of 4 tubes; housed or unhoused (see illustration); can be applied for either pressure or vacuum.

SCHEMATIC OPERATING DESIGN

The reverse air jet mechanism provides uniform cleaning over the entire length of the tubes, and operates with a maximum cloth area loss of only 1¾% at any time. Air volumes remain constant and there are no cleaning shutdowns to cause high back pressures and sharp air volume variations.


DUST-LADEN AIR INLET
NO FLAT LEDGES WITHIN HEADER FOR SETTLING
CLEAN AIR ESCAPES THROUGH CLOTH
FELT FILTER TUBE
HIGH PRESSURE AIR BLOWS DUST FROM INSIDE OF CLOTH
DUST RETAINED ON INSIDE OF FELT
CHOKE CONE
CLEANING RING TRAVELS SLOWLY UP AND DOWN
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Useful New Books & Government Publications

Better Handling

MODERN METHODS OF MATERIALS HANDLING. *By The Material Handling Institute. Published by Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y., 1951. 248 pages; 8½x11¼ in., cloth. Price, $5.50.*

Materials handling is one of the few areas of production in which the food producer might cut, or at least keep abreast of, mounting costs.

The highlighting here of advantages of a more efficient and productive use of manpower should make this book very welcome. Not only does it offer a very broad coverage of industrial methods, but it gets down to specific cases. No less than 16 chapters are devoted to materials handling in food and beverage plants. While these chapters are very short, they do discuss actual plant operations.

And the food plant operator will also gain by a careful study of the methods employed in plants of the other industries here described.

Milling in England

FLOUR MILLING PROCESSES. *Edition. By J. H. Scott. Published by Chapman & Hall, Ltd., 37 Essex St., W. C. 2, London, England, 1951. 670 pages; 5½x9 in.; cloth. Price, 55s.*

Fifteen years and the upheavals of World War II stand between this and the first edition, published in 1936. Naturally, flour making has been affected, particularly in England, whence comes this work.

Through revision and additions, this volume reflects these changes, while holding to its basic purpose of investigating and discussing milling processes.

As a book by a miller for millers, it is projected in broad outline and touches every phase of the millers' science, from wheat growth and evaluation to flour bleaching and sanitation.

Fats and Oils

INDUSTRIAL OIL AND FAT PRODUCTS, 2ND EDITION. *By Alton E. Bailey. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y., 1951. 967 pages; 6¼x9¼ in.; cloth. Price, $15.*

When the first edition of this book appeared in 1944, it was welcomed for its effectiveness in filling in many of the gaps in fats and oils technology. That book's treatment of shortening agents, bakery products, and other foods, and its practical procedures on refining, bleaching, deodorization, and hydrogenation were particularly noteworthy.

Fats and oils research has been especially productive in the seven years since 1944. As a result, this edition is largely rewritten, though its plan and scope remain essentially the same as its predecessor. Two exceptions stand out: Figures on production and consumption have been eliminated, and the chapter on handling, storing and grading has been greatly expanded.

Buying Guide

MATERIALS HANDBOOK, 2ND EDITION, *By George S. Brady. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y., 1951, 913 pages; 6x9¼ in.; cloth. Price $8.50.*

Any food engineer responsible for the selection and maintenance of equipment and materials will find this book highly useful. It gives practical data on approximately 9,000 materials, providing pertinent facts on most metals, alloys, refractions, abrasives and woods. Materials are arranged in alphabetical order, and data include the chief characteristics, comparisons, sources, substitutes, adulterants and uses.

In this edition, too, what had been a tabular appendage of often-required reference data has now been expanded into an arrangement of basic economic information, thus giving the reader the "why" as well as the "how" in the procurement of the various materials.

Factory Operations

TECHNIQUES OF PLANT MAINTENANCE. *Published by Clapp & Poliak, Inc., 341 Madison Ave., New York, N. Y., 1951. 223 pages; 8½x11¼ in.; cloth. Price, $6.*

Actually, this book comprises the proceedings of the second plant maintenance conference (held in Cleveland, in January, 1950). But it could well stand on its own as a comprehensive and substantial treatment on the subject of maintaining the industrial plant at top operating efficiency.

The term *maintenance,* as here conceived, runs the gamut of plant operation from inspection procedures and frequencies to painting and decorating. Along the way it covers such aspects as human relations, incentive

payments, planning, and scheduling, as well as the physical problems common to all industrial manufacturing.

Not to be overlooked is the chapter on food processing plants, which is covered by three papers and a full account of the questions and answers the food session evoked.

Government Publications

FROZEN APPLE-JUICE CONCENTRATE: APPLICATION OF LABORATORY DATA TO PROSPECTIVE COMMERCIAL OPERATIONS. *By Vern F. Kaufman, C. C. Nimmo, and L. H. Walker. Western Regional Research Laboratory, Albany 6, Calif. AIC-293. Mimeographed.* A method for commercial production of a full-flavored apple-juice concentrate is proposed, on the basis of laboratory data. The important processing steps are discussed, a flow sheet is presented, and estimates of probable plant investment and processing costs are given.

STATUTORY NET-CONTENT MARKING REQUIREMENTS FOR PACKAGES (UNDEFINED) AND PACKAGES OF FOODS, DRUGS, COSMETICS. *By Kathryn M. Schwarz and Ralph W. Smith, National Bureau of Standards Circular 503.* The summary and tabulation of statutory requirements for net-content declarations on packages in general and on packages of foods, drugs, and cosmetics in particular, which are presented herein, are based upon the latest available statutes of the United States and of the States, Territories, District of Columbia, and organized island possessions of the United States.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

PRODUCTION OF MANUFACTURED DAIRY PRODUCTS, 1949. *Bureau of Agricultural Economics, Statistical Bulletin No. 93. Mimeographed.* Gives data by types of commodity, by states, and by months for the last calendar year for which complete figures are available. Only preliminary and partial figures are available in mimeographed form for 1950. Annual reports for fiscal year 1950, which ended last June 30, have now become available from most of the research bureaus and agencies. Those desiring to review the work of any particular bureau or independent establishment should request reports directly from agencies.

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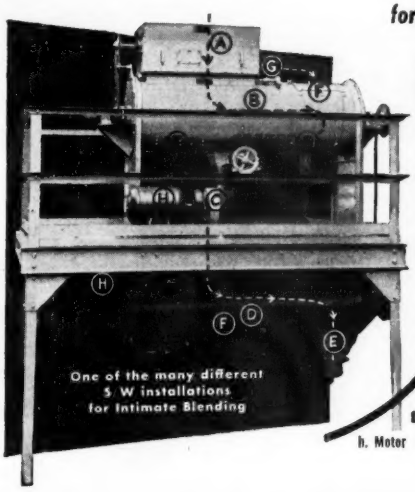

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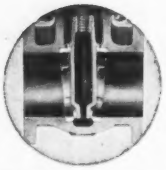

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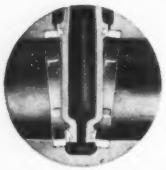

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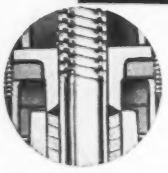

Brass Liner on Glands assures greater resistance to corrosion and scoring.

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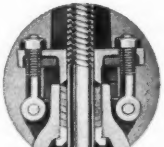
Bronze Back-Seat Bushings in bonnets of OS&Y valves.

Solid Web Type Disc in OS&Y valves for greater strength and longer service.



Hinged Gland Eye-Bolts on OS&Y valves permit faster, easier repacking under full pressure.

KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Tin Outlook Improves

Outlook for tin containers is good. As a result of the government's tin buying policy, there will apparently be no further cut in use of the metal for cans, nor will some of the "fringe" uses of cans, such as for beer or other so-called luxury foods, be curtailed.

In a few months, government spokesmen say, canners should have little trouble getting enough tin cans. Thus the official government policy of "guns and butter both" appears to exclude tin cans particularly in view of the prediction that tin can supply will equal 1950 production.

But food equipment manufacturers will be short nickel-steel and other alloy steels for several years. It is generally felt, however, that the structural and sheet steel shortage will be over by mid-1952.

Although government policy is to keep all essential equipment manufacturers in business, food machinery makers do not have too high a priority on alloy and stainless steel.

Some government officials would like to see food equipment makers convert to military goods, but indecisive conditions in Korea (even after a cease-fire) make it hazardous for the manufacturers to change.

Gel Coat Stops Fruit Rot

A new preservative coating for fruit and vegetables has been developed by the chemical research laboratory of D. W. Bingham & Co. Pty Ltd., Melbourne, food-processing and canning machinery firm.

It consists of a carboxymethyl cellulose gel carrier that embodies cetyltrimethyl ammonium bromide. The coat is applied as an aqueous emulsoid by spraying or dipping. If sprayed, the emulsoid forms a film less than .001 in. thick when set and dried. Drying takes about three hours at normal temperatures and film formation is said to be hardly affected by treated surfaces being in contact with each other. Fruit takes on a slightly polished appearance.

Claimed to be an improvement over wax or lacquer coatings, the composition slows down but does not stop the metabolic process, which continues in untreated fruit for some time after picking. This enables the fruit to "breathe" and delays the onset of autoenzymatic decay processes. On the other hand, the coating is claimed to set up an efficient barrier against penetration of micro-organisms.

The gel is easily removed by washing with water, but does not impair the taste of the product when left on. Sampled separately, the gel is bitter to the taste.

Bingham developed the coating to help its customers spread out the canning of fruit and vegetable crops without expensive cold-storage installations. The company's chemists are testing various other water-soluble cellulose derivatives with similar cationically ionized ammonium compounds in order to provide a more complete line for fruit and vegetable growers and packers.

Up Inspection Fees

USDA has raised its fees for inspection of fresh fruit and vegetables and intends to raise inspection fees on canned and processed foods. The fresh fruit and vegetable fees became effective July 16.

New USDA inspection fees for fresh fruits and vegetables are: (1) Carlot, for quality and condition, $9 (formerly $7.50); (2) Half-car or less, $6 (formerly $5); (3) Carlot, for condition only, $7.20 (formerly $6); (4) Half-car or less, condition only, $4.80 (formerly $4); (5) Hourly fee, $3.60 (formerly $3); (6) Nuts, carlot, $12 (formerly $10).

Maximum carlot fees have been increased to $18 (formerly $15) for quality and condition inspections and to $14.40 (formerly $12) for condition only inspections. Maximum fee for an appeal inspection has been increased to $24 (formerly $20).

Under the proposal for canned and processed foods, the inspection fee for each 1,000 cases of canned foods, after a minimum fee for the first 600 cases, would be increased to $8 (formerly $7), for a 50,000-pound car of frozen foods, to $22 (formerly $19); for a 60,000-pound car of dried fruits—other than figs and dates—to $18 (formerly $14.60); for a 60,000-pound car of figs or dates—to $45 (formerly assessed on an hourly rate); hourly rate to $3.60 (formerly $3).

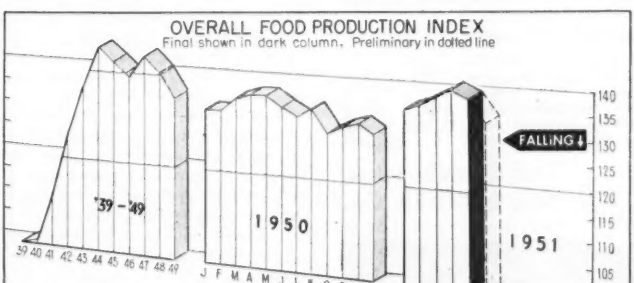
Wisconsin Food School

With the completion of its multimillion dollar building, the University of Wisconsin's new Dairy Food Industries School will be ready for classes this September.

Facilities of the new building are described by one visitor as ideal for food trainees. The building boasts pilot plants and student processing rooms for each branch of the food industry, in addition to fully equipped laboratories and classrooms.

Under the direction of K. G. Weckel, the new school will stress a four-yr. course. Object is to provide trained men for smaller food plants. It is the administrator's opinion that these smaller plants cannot afford and do not require the high degree of training demanded by the larger plants and to which the five-yr. courses are directed. The industry, he says, needs versatile and practical-minded men even more than it needs skilled food technologists.

This idea is carried out in the curriculum, which includes such studies as engineering, chemistry, bacteriology, economics, sanitation, botany, agronomy and physics—with emphasis on laboratory technics.



Imagine your dog's delight on seeing a solid column of biscuits 160' long and 42" wide! That's the carrying surface of this Cambridge Woven Wire Conveyor Belt in a recirculating oven at Kendall Foods Company, Bell Gardens, California.

Balanced Weave, specified for this installation, is low in cost, eliminates creeping of the belt on the drive pulley, and provides high tensile strength. Open mesh of the belt allows free circulation of heat within the oven . . . crumbs and broken bits of biscuit fall through the belt, cannot foul up automatic packaging equipment at the end of the oven.

Whether you're baking biscuits, processing meat or canning vegetables, there's a Cambridge Woven Wire Conveyor Belt to help mechanize your production. Stainless steel to meet sanitary codes is a standard material of construction for our food plant customers. Call in your Cambridge field engineer today, let him explain the superior construction features of . . .

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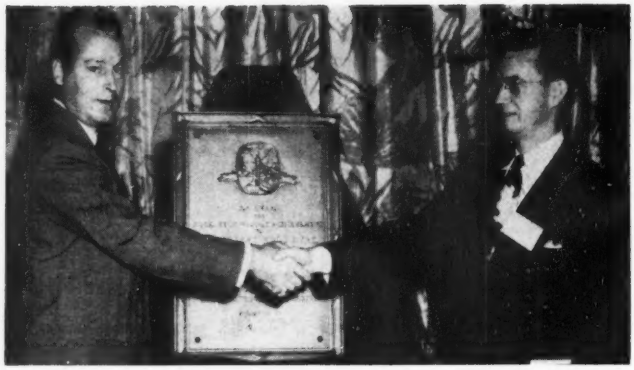

We Give . . .

Harry Goff, James Dole Engineering Co., (left) receives 1951 FOOD ENGINEERING award plaque from Editor F. K. Lawler. Goff accepted the award for Robert T. Andersen, president, Andersen's Foods, the company selected by an IFT jury for its outstanding contribution to food technology in application of the Martin aseptic canning process in production of high quality canned pea soup.

. . . And We Get

For its series of articles on military food requirements which appeared during 1950, FOOD ENGINEERING received an Award of Merit for editorial excellence offered by *Industrial Marketing*, the magazine addressed to the business publishing field.

More "Chemical" Hearings

The Delaney "Chemicals-in-Foods" Committee has decided to continue hearings after summer recess. It will issue another interim report similar to one issued by the committee organized under the last Congress.

It is believed the committee is laying a broad groundwork for defense of its expected recommendation that the Food & Drug Law be amended to include a "new chemicals" section similar to the "new drug" section. This amendment would mean prior approval of any chemical used in, or in the processing of, food or drink.

There is some opposition from the food industry, and much from the chemical industry, to any strict regulation calling for prior approval. The committee is gathering enough ammunition, at least in quantity, to rebut the users and makers of food chemicals when proposals are made in Congress. There already is a bill in the House (by Rep. Miller) to carry out what the committee will no doubt recommend to Congress next fall.

Better Tomato Juice

Better quality tomato juice in bigger yields is possible through addition of small amounts of sodium hexametaphosphate to tomatoes prior to juicing. This development was reported by Roy E. Morse, Monsanto Chemical Co., at the recent IFT meeting in New York.

Dr. Morse found that the chemical sequesters calcium, thus preventing calcium and pectin from joining to form sticky gels, which hold some of the juice in the pulp. This trapping power also prevents ascorbic acid destruction by tying up the copper that ordinarily speeds up reaction of oxygen to ascorbic acid.

Only about 1 lb. of hexametaphosphate for every 100 lb. of tomatoes is required to do the job. Yields are increased by about 10 percent.

Dr. Morse pointed out, however, that F&DA has not approved use of this chemical in tomatoes, though it has been cleared for certain other foods. Individual users, he said, wi'l have to obtain F&DA's approval.

Canned Milk Shakes

Canned milk shakes for Army camps are being produced by Andersen's Food, Inc., Santa Barbara, Calif., through another application of the Martin aseeptic eanning process. While no data on storage life of milk shakes are yet available, the product is said to have had an enthusiastic reception.

Andersen's application of this asceptic process in the production of pea soup won for the company this year's FOOD ENGINEERING Award for outstanding achievement in food technology.

Develop Avocado Paste

An avocado product called "guacamole" with keeping qualities suitable for handling and distribution as a frozen food has been developed through studies at the University of California and other research institutions.

It was found that by increasing acidity of existing household recipes to about pH 4.5, the light green color and avocado flavor could be retained in frozen storage for at least a year. Collapsible metal tubes turned out to be a convenient container, although cans, jars and waxed filter cups can also be used.

In preparing this frozen avocado paste, sound, ripe fruit is thoroughly washed, preferably with a good detergent, then rinsed with cold water to minimize microbial contamination. Rinsed fruit is pared and all discolored spots, damaged portions and seeds are removed. Next, the fruit is pureed by sieving or by passing through a food grinder. Sieving gives smoother texture, but the coarser texture resulting from grinding is preferred by many. The puree is then mixed with lemon or lime juice, salt, and onion powder in the following proportions by weight: Puree, 100 parts; lemon or

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ONLY 1 MOVING PART

in Nicholson Expansion Steam Traps

There is not a pin, not a bearing, not a link nor a lever to wear in this Nicholson expansion steam trap. The valve is the only moving part. This extreme simplicity is resulting in remarkably low maintenance costs. There are hundreds of instances of traps in continuous service for as much as two years without even a sign of valve cutting.

Appreciable fuel savings are also being effected. Traps are easily adjusted to pass condensate at any temperature below 212° F, instead of at near steam temperature.

Easily installed, often without supports. Lengths, 18" to 40". Pressures, 0 to 250 lbs. No air binding.

Remarkably Low Maintenance Costs Shown on Many Varied Installations

FOR ALL EQUIPMENT Using Steam or Hot Water

Cookers	Pasteurizers
Crystallizers	Preheat Tanks
Dryers	Rendering Tanks
Evaporators	Retorts
Heat Exchangers	Sterilizers
Juice Heaters	Washers
Kettles	Water Stills

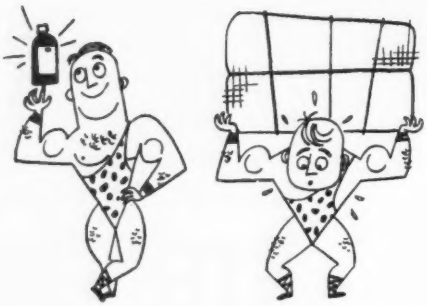
Catalog 751 or see Sweet's

W. H. NICHOLSON & CO., 193 Oregon St., Wilkes-Barre, Pa.

give your products

a new **"taste-lift"** with

SPISORESINS



● Samson made an unshakable place for himself in history by hefting mighty objects, and strong men the world over have since labored to emulate him. But the modern food processor and manufacturer of dry and liquid seasonings is seldom naturally equipped for such activity. Therefore to transport and store the heavy, awkward bags of spices his products require, he must perforce hire warehouses, trucks and several muscular, 20th century Samsons!

● Not so the manufacturer who has discovered **SPISORESINS!** For **SPISORESINS** require no more space than the neat, compact essential oil bottles on his plant shelf, and are as easy to use. Pourable, of superior flavor value, entirely free of mold and yeast spores, **SPISORESINS** simply eliminate the storage problem. A 5 lb. bottle of **SPISORESIN** Black Pepper is equal in flavor value to a 150 lb. bag of the spice itself. Solvent extractions of natural spices, **SPISORESINS** are available in all important Basic flavors and over 60 different Compounds.

● Give your products a "taste-lift"—your entire operation a "convenience-lift". Let the small bottle of **SPISORESINS** retire the extra warehouse, the truck, the sanitation problem, and the "Samsons" to the glorious, but inconvenient, past.

D&O ESTABLISHED 1796

DODGE & OLCOTT, INC.

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ESSENTIAL OILS · AROMATIC CHEMICALS
PERFUME BASES · VANILLA · FLAVOR BASES

Measure Food Colors

Tested at several food laboratories, including WRRL, Albany, Calif., and the New York Experiment Station, Geneva, the Hunter color and color difference meter has been declared accurate in showing the correlation between color of raw material and the processed product. It will also aid in determining the extent to which color is related to other qualities of a particular food. Shown here are Dr. Marvel-Dare Nutting and Harold C. Lukens, Gardner Laboratories, Bethesda, Md. (Wide World)

lime juice, 8 to 10 parts; salt, 1 to 2 parts; dehydrated onion powder, 0.3 parts. The onion powder may be omitted or modified if desired, or garlic powder substituted.

These ingredients are blended, then filled into a suitable container and frozen at 0 to −10 deg F.

The product is useful as a spread for canapes, potato chips or crackers. It can also be mixed with mayonnaise, sour cream, or other dressing to add flavor to salads.

Honey Classifier

A simple color comparator with permanent glass standard for extracted honey has recently been developed by the Eastern Regional Research Laboratory. The apparatus is similar to the color comparator for maple syrup developed at the same lab more than a year ago. (*Food Industries*, May, 1950, p. 82)

Tests made with clarified honeys, selected and blended to correspond with the standard scale readings of the Pfun wedge comparator, indicated that the most suitable standard container would be a 2 oz. square bottle having an internal thickness of 1.24 in. Advantages of this bottle are: it is inex-

pensive and commercially available; the thickness of layer facilitates precise grading, since honeys of standard color are widely spaced on a color scale when viewed in this thickness; and the square shape provides a view of uniform thickness.

Selection of suitable colored glasses to be used as standards was done by means of spectrophotometric measurements on filtered honeys, solutions of caramel in glycerin, and commercially

(*Turn page*)

Hors d'Oeuvres

• "California citrus products," says the California Fruit Growers Exchange, "are going to push Florida frozen and canned citrus items right off the map in Southern California and end once and for all the fantastic sight of homemakers ignoring superior California citrus products for those of Florida." Well, someone should have explained this superiority before. Ridiculous to let a homemaker's sense of taste get the better of her judgment.

• *If you haven't been notified that "breakfast moves into the headlines this September when the Cereal Institute inaugurates the first annual Better Breakfast Month," you just aren't on the right mailing list. So if you find War and Communism dumped onto the inside pages of your newspaper, you might as well grab a spoon and go right along.*

• This Cereal Institute gives some intriguing statistics on breakfast habits, to wit; 1 child in 5 eats an adequate breakfast, while 4 out of 10 teen-age girls and women and only 5.6 out of 10 men start the day nutritiously right. And, it adds, twice as many older teen-age boys have poor breakfast habits as do younger teen-age boys. Which parents of most teen-age boys would interpret to mean something like 2 in 10,000 and 1 in 10,000 respectively.

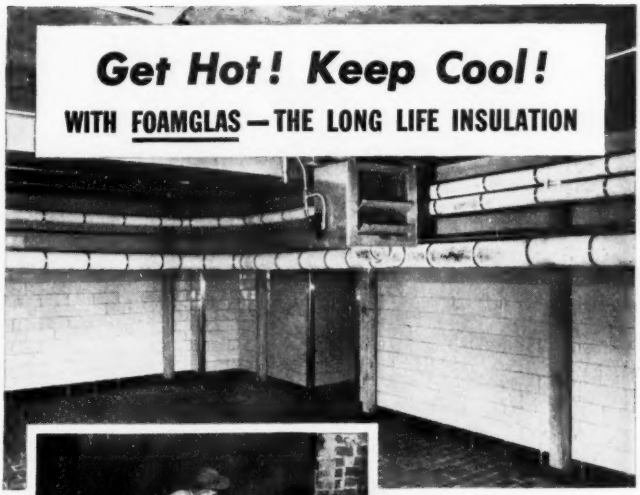
• *Not so long ago* Collier's *put in a claim that ice cream sundaes were first served up as a cure for hangovers. Did* Collier's *mean this as a knock or a boost!?*

• Israelians can't decide whether mechanization in citrus packing actually saves on packing costs. So they are experimenting before jumping headlong into a modernization program. Guess it would be pushing unduly to tell them that mechanical contraptions of all kinds have done real good over here.

• *A poultry man in England ended "cannibalism" among 2,000 laying hens after 25 had been killed by putting plastic specks on 300 offenders. Now they can see only sideways and down. The U. N. could do worse than consider this proposition.* J. A. J. J.

Get Hot! Keep Cool!

WITH FOAMGLAS—THE LONG LIFE INSULATION



Here you see FOAMGLAS being applied to the wall of the refrigerating room of the Ceres Grill, Washington, D. C., and how the finished job looked after FOAMGLAS had also been installed in the ceiling, under the floor and on the pipe lines. Architect: Katherine Cutler Ficken, Silver Spring, Md. Consulting Mechanical Engineer: John G. Loehler, Washington, D.C.

• Wherever food products in quantity must be protected, processed and stored, this unique material has proved its ability to insulate tanks and vessels, walls and floors, roofs and ceilings, hot and cold piping and processing equipment. It helps keep hot things hot and cool things cool.

Long lasting effectiveness and freedom from costly repairs, maintenance and replacement, make FOAMGLAS—on a cost-per-year basis—the most economical insulation you can use.

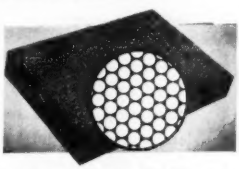
When you are figuring on insulation, make sure you have the latest information on FOAMGLAS. Send in the convenient coupon for a sample of FOAMGLAS and copies of our informative booklets.

PITTSBURGH CORNING CORPORATION
PITTSBURGH 22, PA.

PITTSBURGH PC CORNING

FOAMGLAS®

the cellular glass insulation



The *best* glass insulation is cellular glass. The *only* cellular glass insulation is FOAMGLAS. This unique material is composed of still air, sealed in minute glass cells. It is light weight, incombustible, verminproof. It has unusually high resistance to moisture, chemicals and other elements that cause insulation to deteriorate.

Pittsburgh Corning Corporation
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Please send me without obligation a sample of FOAMGLAS and your FREE booklet on the use of FOAMGLAS for Normal Temperature Commercial, Industrial and Public Buildings ☐ Refrigerated Structures ☐ Piping and Equipment ☐.

Name.....

Address.....

City.....State.....

WHEN YOU INSULATE WITH FOAMGLAS . . . THE INSULATION LASTS!

NOW YOU CAN KNOW

When The Crop Is Ready To Harvest

Packing or freezing a vegetable at peak maturity and flavor often means up-grading an entire crop. The only *fast* sure way to check maturity of sweet corn, lima beans and many other vegetables is by measuring moisture content.

***Oconomowoc Wisconsin Canning Company, shown above, reports:* "We used the Steinlite Moisture Tester exclusively for the past three years in pre-grading, thus eliminating all guesswork in arriving at the proper time of harvest. It operates economically and accurately and we found no special training was required."**

Anyone can operate the NEW Steinlite Moisture Tester. You need no laboratory, no complicated installation, no trained personnel. In six minutes, following simple instructions you can measure moisture of a vegetable—tell exactly when it's ready for picking.

LEARN HOW YOU CAN POSITIVELY MEASURE MATURITY.

Write for our "Report to Food Packers"—no obligation.

SEEDBURO EQUIPMENT CO.

734 Converse Bldg. Chicago 6, Ill.

available glasses of assorted colors.

The comparators are all-metal boxes having dimensions approximately 8 x 2 x 3 in. divided by thin partitions into five compartments, each of which has a front and rear window. Three lighter glass standards (water white, extra white and white) are mounted in one box in compartments 1, 3 and 5. Three darker standards (extra light amber, light amber and amber) are similarly mounted in a second box. Bottles filled with distilled water (blanks) are placed in the compartments behind the glass standards.

A bottle containing honey to be classified is then placed in either compartment 2 or 4. To assist in the classification of honeys that are appreciably turbid, three bottles containing suspensions of bentonite in distilled water are also provided. These are used interchangeably with any of the clear blanks to reduce brightness of the glass standard to a level near that of honey.

By comparing the honey sample with different standards under varying conditions of light, color classification of honey is quickly and satisfactorily determined.

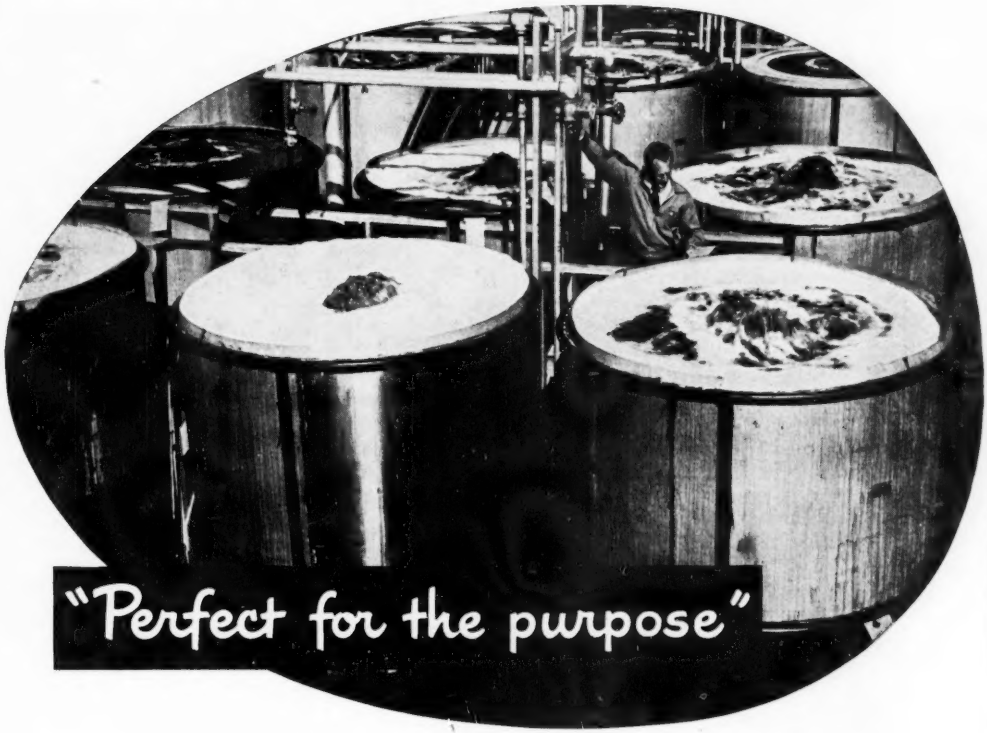
CMP Allotment Booklet

A booklet containing information on how to set up records and prepare forms under the Controlled Materials Plan has just been issued by NPA.

Companies operating under CMP should write for a copy of this booklet immediately, says NPA, since the government will determine the balance of supply of steel, copper and aluminum solely from paper work done within the plants.

Copies can be obtained by writing Edward K. Moss, Director of Public

WAIT A MINUTE—WHAT D'YA THINK YOU'RE GONNA DO?



● For processing ripe and green olives, the Pacific Olive Company needed a tank material that is completely sanitary and easy to keep clean. This material must not corrode or otherwise deteriorate under exposure to salt, alkalies, lactic acid, tannin, and outdoor atmospheres. Tanks must be light in their supports, yet tough and rigid. They must look bright and neat year after year without painting.

Mighty tough specifications for any material, yet ENDURO Stainless Steel meets them all perfectly . . . and throws in long life for good measure. So satisfactory was the performance of the first tank that eight more immediately were ordered, then 31 and finally 20 more for a total of 60! A company spokesman sums it up by saying, "stainless steel is perfect for our purpose . . . it is the only possible material which can fill all our requirements."

Do your own equipment requirements parallel these? Then ENDURO Stainless and Heat-Resisting Steels could be perfect for your purpose, too. Republic technical and metallurgical staffs will help you use the many available analyses profitably. Just write:

REPUBLIC STEEL CORPORATION

Alloy Steel Division • Massillon, Ohio

GENERAL OFFICES • CLEVELAND 1, OHIO

Export Department: Chrysler Building, New York 17, N. Y.

Republic

REPUBLIC STEEL

ENDURO® STAINLESS STEEL

Other Republic Products include Ex-L-ite Tin Plate, Pipe, Sheets, Bolts and Nuts, Electrunite Tubing, Niles Barrels and Drums

Yes ...WE FABRICATE TO U-68, 69 AND 70, A.S.M.E. CODE REQUIREMENTS

X-Ray inspection at DOWNINGTOWN

To fabricate welded and riveted products up to 1¼" in thickness, the facilities of DOWNINGTOWN IRON WORKS include: X-Ray and Magnaflux Equipment, Welding Equipment (manual, heliarc and automatic), a Universal Testing Machine (120,000# capacity) and such other equipment as necessary in the fabrication of A.S.M.E. or A.P.I.—A.S.M.E. Code vessels.

More than 97,000 sq. ft. of space—79,000 under roof and 18,300 in the yard—available for fabrication work. Our personnel—skilled workmen, engineers, technicians and research men—is constantly striving to improve the quality of our products and the efficiency of our production.

DOWNINGTOWN has many years' experience in fabrication of Carbon Steel, Stainless Steel, Stainless Clad, Nickel Clad . . . and many of the Non-Ferrous Metals. Send for Bulletin entitled: "Partial Analysis of 1950 A.S.M.E. Code" . . . useful as a handy reference guide . . . and explains our facilities.

DOWNINGTOWN IRON WORKS, INC.
DOWNINGTOWN, PA.
STEEL & ALLOY PLATE FABRICATION
HEAT EXCHANGERS

NEW YORK OFFICE • 30 CHURCH STREET

Feather Products

Feathers, once a liability in poultry processing plants, are being turned into useful materials at reasonable cost through studies made at WRRL. C. H. Binkley, one of the lab's researchers, is seen here pouring a foam fire extinguisher medium, and at extreme left is ground fertilizer meal—both developed from poultry feathers. (Wide World)

Information, National Production Authority, Department of Commerce, Washington, D. C. Title of the booklet is "Allotment Accounting for Consumers Under CMP."

Canadians Form Institute

The Canadian Institute of Food Technologists was formed recently when 20 representatives from widely separated parts of the Dominion met at Winnipeg. Included in the gathering were delegates from the three existing Canadian food technology groups.

Dr. E. C. Chamberlayne, Manitoba Department of Public Health, was elected president of the new institute, and Reg. R. Rife, editor, Canadian Food Industries, became secretary and treasurer. Mr. Rife holds the same offices with the Montreal Food Technologists Assn.

Milk Radiation

Progress in preserving foods through use of atomic radiation was reported at the IFT convention by a Columbia University research group.

Raw milk treated with 2,000,000v. X-rays (substantially the same energy as emitted by Gamma Rays from an atomic pile) maintained its flavor, nutritive value and appearance for seven weeks.

(*Turn to page* 197)

EATON
2-Speed Truck
AXLES
Can Take It!

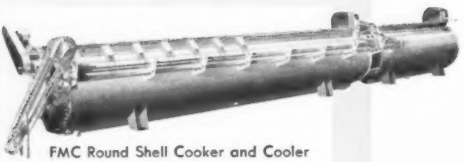
Ruggedness of design, plus such exclusive features as planetary gearing and forced-flow lubrication, reduce stress and wear to a minimum, add thousands of miles to axle life. Eaton 2-Speed Axles also add to the life of the vehicle and insure lowest cost per mile, particularly in the kind of service where extra pulling power must be combined with speed. Because Eaton 2-Speed Axles provide the best gear ratio for every operating condition, they permit engines to run at most efficient speeds, and reduce strain on engine and power transmitting parts. Ask your dealer to explain how Eaton 2-Speed Axles will help your trucks do more for less.

Axle Division

EATON MANUFACTURING COMPANY

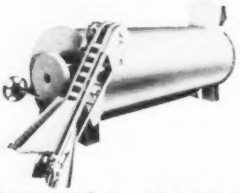
CLEVELAND, OHIO

PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • JET ENGINE PARTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS SPRINGTITES • SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

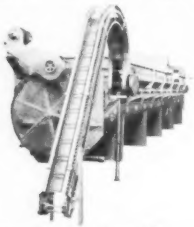


FMC Round Shell Cooker and Cooler with variable inlet

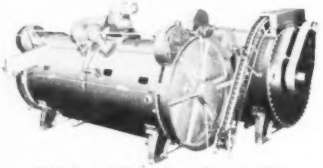
FMC Round Bottom Cooker and Cooler with single inlet



FMC Round Shell Cooker with single inlet



FMC Large Diameter Round Bottom, High Capacity Cooker and Cooler



FMC Round Shell, High Speed, High Capacity Cooker and Cooler with positive transfer valve

fmc

CONTINUOUS *ATMOSPHERIC* COOKERS & COOLERS

Companion line to the Famous
FMC "One-Man Cook Room"
Sterilmatic *Pressure* Processing Line

Engineered for best results in processing at atmospheric temperatures

This extensive line of FMC open-type cookers and coolers, developed and perfected through more than 50 years of research and engineering experience, has found broad acceptance in the canning industry. Thousands of these units are in use today, meeting efficiently a variety of specific requirements and applications. Designed for atmospheric processing (up to 212° F.), they are ideally suited for those operations where the high temperature processing afforded by FMC Pressure Cookers and Coolers are not required. This equipment also has wide application when used as independent-drive can coolers following pasteurization. FMC Atmospheric Cooker and Cooler lines are ruggedly built to handle various can sizes at capacities up to 300 c.p.m. Savings in steam and labor contribute to their remarkable economy and efficiency.

CHOOSE FROM SIX TYPES OF ELEVATORS FOR ANY FEED ARRANGEMENT

- **Type A**—Standard straight gravity in-feed with single outlet.
- **Type B**—Overhead positive feed.
- **Type C**—Overhead gravity feed.
- **Type D**—Standard straight gravity in-feed with variable inlet.
- **Type E**—Right side gravity feed.
- **Type F**—Left side positive feed.

Write for full information, or call your nearest FMC representative.

First in Food Equipment

fmc
FOOD MACHINERY AND CHEMICAL CORPORATION

FOOD MACHINERY AND CHEMICAL CORPORATION
Canning Machinery Divisions

General Sales Offices:

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Other samples, treated with as much as 100,000 Roentgens of radiation likewise suffered no changes in flavor, appearance or vitamin content.

Irradiated milk, too, remained fresh for extended periods depending on the amount of radiation the samples received. Milk receiving dosages obtainable from available mixed fission products kept a minimum of one month under ordinary refrigeration.

F&DA Food Standards

Status of food standards of Food & Drug Administration in early July is reviewed below:

Policy Statement

Unofficial, but pertinent to F&DA food standards, is the rumored opinion of National Research Council's Food Protection Committee on the use of emulsifiers in foods: This group feels that the toxicities of emulsifiers such as mono- and diglycerides and polyoxyethylene derivatives have not yet been studied long enough to show that they are harmless for unrestricted use in foods. Several reasons for this conclusion have been suggested, but the Committee had not made any public statements up to the date of this writing.

Future Hearings

1. *Canned tomatoes,* standard of identity, amendment, August 7, to consider the deletion of required label declaration of optional ingredient (a) (3): "The liquid strained from mature tomatoes of such varieties." Bernard D. Levinson was designated presiding officer; page 6543, July 4 *Federal Register.* No opposition is anticipated.

2. *Canned pineapple and canned pineapple juice,* standards of identity, quality, and fill of container. Postponement of hearing to October 29 now rumored. Proposed standards will be printed in *Federal Register* soon.

3. *Salad dressing* standards will be subject of rehearing on the use of "cream, milk, and milk products" as optional ingredients, following the March 21 decision of Third Circuit Court of Appeals in answer to petition of Cream Wipt Food Products Co., Philadelphia. No date has yet been set.

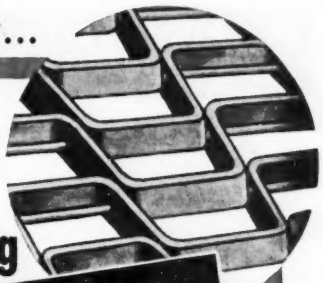
4. *Process cheese food* standards will be subject of hearing on industry proposals to permit skim milk cheese as an optional ingredient. No date has yet been set.

5. *Canned tuna,* hearing rumored but no date set yet; initiative of Administrator.

6. *Frozen vegetables,* hearing rumored but no date set yet; initiative of Administrator.

from hopper to shipper...

FASTER
EASIER
Food Processing



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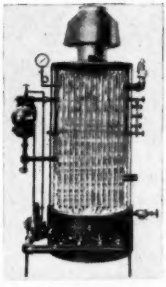
FLEXIBLE STEEL
CONVEYOR BELTING

For every production process, La Porte outperforms and outlasts all other types of conveyor belting. It firmly grips the friction drum or sprockets to eliminate *creeping, weaving* and *jumping.* It has a perfectly flat surface for handling all types of containers, empty or filled. Open mesh feature provides for circulation of air, heat, cold or moisture around products in process. Also facilitates cleaning or sterilizing with steam or scalding water without removing belt from friction drum or sprockets. Highly resistant to heat, cold and corrosion. You get more for your money in a La Porte.

Order LaPorte Conveyor Belting from Your Supplier TODAY—Available in any Length, Almost any Width

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

WHY BE BOTHERED?



THE KANE Boiler is built to A.S.M.E. specifications, in sizes to 30 H.P. The M-K-O Automatic Boiler Feed returns condensate and supplies small quantities of hot water as needed to the KANE Boiler.

NO FUSS, NO WORRY WITH
the KANE BOILER PACKAGE

Here's a truly "unitized" steam supply—a compact, self-contained BOILER PACKAGE that is completely automatic . . . requires no attendant and only a bare minimum of floor space. The KANE BOILER PACKAGE includes: the correctly sized Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.

Engineered Steam at its best with four decades of experience at your disposal—so, send your steam problem to us for study and recommendation.

ENGINEERED STEAM AT ITS BEST

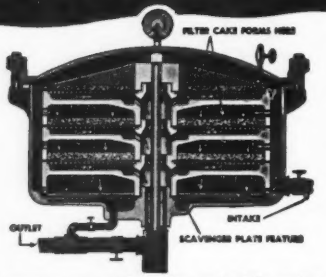
MEARS-KANE-OFELDT INC.
P.O. BOX 223 BRIDGEPORT, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE

FOR HIGH SPEED, UNIFORM FILTRATION REQUIRED IN FOOD PROCESSING

SPARKLER horizontal plate FILTERS

Capacities 50 G.P.H. to 5000 G.P.H.



HERE ARE A FEW FOOD PRODUCTS THAT SPARKLER FILTERS HANDLE WITH EASE:
Candy Syrup
Chicken Broth
Cider
Egg Albumen
Extracts
Flavors
Honey
Gums
Liquors
Milk
Molasses
Vegetable Oil
Syrups
Vinegars
Wines
Fruit Juices
Alcohols
Alkalies
Beverages

Sparkler Filters operate on a distinctive principle, using horizontal plates, that are particularly efficient in maintaining uniformity in operation over a wide range of pressure, temperature, or viscosity conditions.

Filters water sparkling clear, removes all off-tastes, odors, color, sediment, chlorine, sulphur, algae, pipe rust, etc.

Because filter media are supported on a horizontal plane and filter aids floated into position uniformly, filtration takes place uniformly over entire filtering areas. Flow through filter is always with gravity. The patented scavenger plate filters the last drop, leaving no hold over in batch filtration.

We invite correspondence on your problems. You will receive the advice of filtration engineers with over a quarter of a century experience in a specific field.

SPARKLER MANUFACTURING COMPANY
MUNDELEIN, ILLINOIS

• IN FOOD PROCESSING
When You Use Low Temperature
USE CORK

The time to make sure of your insulation protection is before you build or expand. Get the facts on Cork insulation when they can do the most good. Cork is so efficient in insulating properties that its performance has long been the accepted standard for low temperature requirements. Its wide usage in the refrigeration industry is due to its proved record for more than 40 years. Mundet refrigeration engineers are experienced in all details of temperature control. Write to us now for recommendations and estimates . . . let us help you secure the most profitable use of low temperature. Mundet Cork Corporation, Insulation Division, 7101 Tonnelle Ave., North Bergen, N. J.

MUNDET
CORK INSULATION

Hearing in Progress

Ice Cream, new, standard of identity. On July 10 a summer recess was announced until September 5. On that date the subject of sherbets and ices will lead off. Some supplemental testimony on flavorings may follow. Frozen custard and French ice cream, miscellaneous items, and finally pharmacologic and other technical evidence concerning surface-active agents will complete the ice cream hearing. Prior to the July 10 recess, minimum fat content, total milk solids, mineral salts, and standardization of acidity were completed.

Tentative Orders Awaited

1. *Residue tolerances,* on fresh fruits and vegetables; new. Expected in late summer or fall; hearing adjourned in September 1950; briefs were filed until December.

2. *Fruit preserves, jellies, and butters,* amendments, standards of identity. Expected soon; hearing adjourned in January; briefs were filed until March.

3. *Margarine,* amendments, standard of identity. Expected soon; hearing adjourned in April; briefs were filed until May.

Final Orders Awaited

1. *Canned corn,* amendment, standards of identity, quality, and fill. Expected soon; second tentative order published page 5874, June 20 *Federal Register;* no written comments received by July 5 deadline.

2. *Bread,* new, standard of identity. Expected soon; effort being made to issue final order as soon as possible; tentative order published August 1950, exceptions filed in November.

3. *Frozen fruits,* new, standards of identity and fill. Expected soon; tentative order published in October 1950, exceptions filed in January 1951.

4. *Canned mushrooms,* amendment, standards of identity and fill. Expected soon; tentative order published in February; exceptions filed in April.

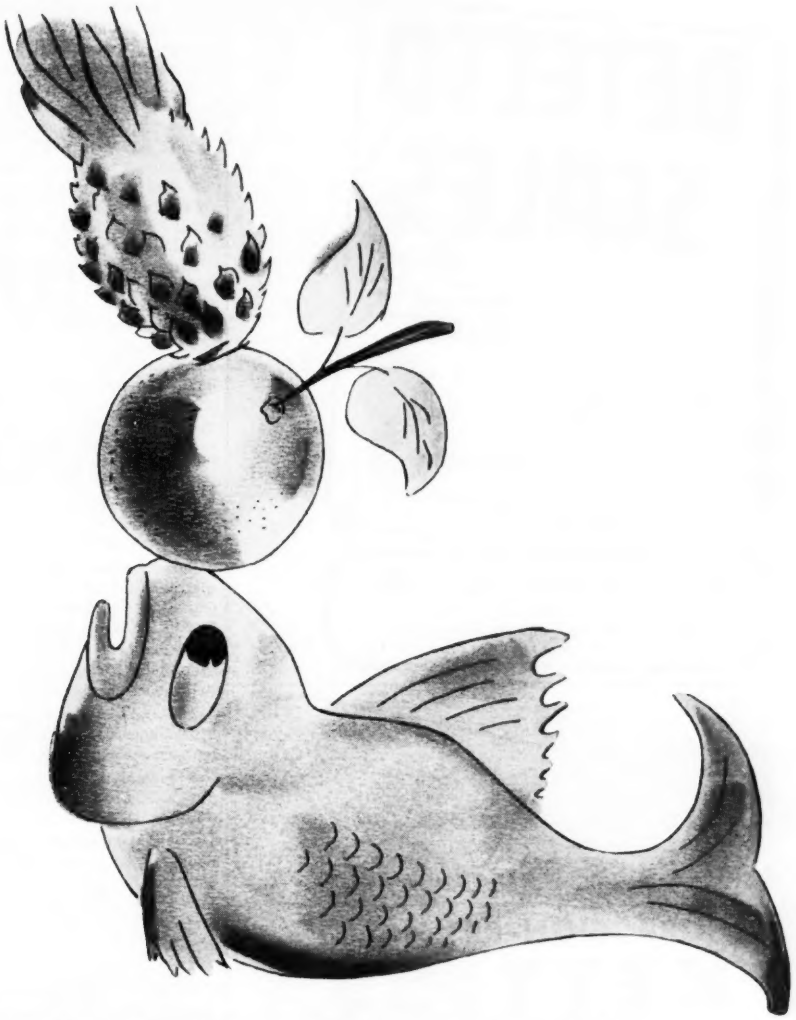
5. *Evaporated milk,* amendments, standards of identity. Expected soon; tentative order published page 5903, June 21 *Federal Register;* written comments received until July 21.

Standards Completed

None since last reported (FOOD ENGINEERING, April, 1951, page 226).

USDA Grade Standards

A list of all "U. S. Standards for Grades of Processed Fruits and Vegetables (canned, dried and frozen)," has been issued as of July 1 by Produc-



Preserving foods . . . from fruit to fish

Whether your product is fruit, fish or any of scores of other foods, you can depend upon Monsanto Sodium Benzoate as your preservative. It protects many products and keeps them appealing to create customer satisfaction and bring repeat business.

Monsanto Sodium Benzoate, the sodium salt of benzoic acid, is among the purest chemicals produced in commercial quantities. It assays 99.0% pure. Like other Monsanto Chemicals for food use, sodium benzoate is manufactured under strict laboratory control.

Monsanto makes sodium benzoate in flake and powder forms, both of which are equal in uniform purity. Many users prefer flakes because they do not cake or ball and are practically free of dust. Both forms dissolve rapidly.

If you require a preservative in your business, you will find Monsanto's 16-page booklet, "*Benzoic Acid and the Benzoates*," interesting and helpful. For your free copy, contact the nearest Monsanto Sales Office or write MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, 1700 South Second Street, St. Louis 4, Missouri.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

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There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

No. 1800 DETECTO-GRAM INDICATOR HEAD

One more Detecto weighing instrument to speed production. This attachment converts your present beam scales to accurate weighing equipment. Indicator stops instantly at correct weight.

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CORROSION-RESISTANT KETTLES

Available in sizes up to 500 gallon capacity to meet every processing need. Easy to clean and keep clean, they are practical and meet all sanitary regulations. All Lee kettles are available with hydraulic cylinders where your own water line provides the necessary operating power to safely control tilting kettles and tilting agitators in agitator kettles.

Our new descriptive bulletins sent on request.

LEE METAL PRODUCTS CO., INC.

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ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE

tion & Marketing Administration. This three-page mimeographed list can be secured, together with any of the standards listed, from Processed Products Standardization & Inspection Division, Fruit & Vegetable Branch, Production & Marketing Administration, U. S. Department of Agriculture, Washington 25, D. C. (Note that this list does *not* include standards for *fresh* fruits and vegetables, or *other* products such as meat, dairy, poultry, etc. Editor).

Also issued, as of July 1, is a list of "Offices of the Processed Products Standardization & Inspection Division," indicating the 33 cities where official inspection of processed fruits and vegetables is available. "Any financially interested party desiring inspection for quality, condition, and grade should communicate with the Inspection Office nearest the point where the product is located," by mail, telegraph, or telephone.

Recent actions by P.M.A. on U. S. Grade Standards and related activities include the following:

Canned Lima beans, third revision, corrections, page 5607, June 13 *Federal Register* (refers to page 3607, April 27 *Federal Register*).

Pecans in the shell, revised, page 5669, June 15 *Federal Register*, effective October 1.

Refiners' syrup, new, proposed, page 5703, June 15 *Federal Register*, written comments received until July 15.

Sugarcane syrup, new, page 5842, June 19 *Federal Register*, effective July 19.

Sweet potatoes for canning, new, page 5922, June 22 *Federal Register*, effective July 22.

Sweet potatoes for dicing or pulping, new, page 5923, June 22 *Federal Register*, effective July 22.

Apples, second revision, page 5919, June 22 *Federal Register*, effective July 22.

Nonfat dry milk solids, revised, correction, page 5971, June 23 *Federal Register* (refers to page 5421, June 8 *Federal Register*).

Shell eggs, Egg products, Live poultry, Dressed poultry, and *Ready-to-cook poultry*, form of application and contract of agreement for grading service, page 6013, June 26 *Federal Register*, effective August 1.

Eggs and egg products, amended grading regulations, page 6337, June 30 *Federal Register*, effective July 1 (Based on proposals on page 5872, June 20 *Federal Register*).

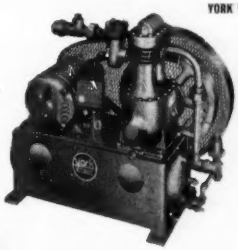
Shelled white spanish peanuts, revised, proposed, page 6466, July 3 *Federal Register*, written comments received until August 2.

Cooling Hot Dough

● A York air conditioning system—regarded by Nabisco as one of the ultimates in dough conditioning—provides automatic temperature-humidity control plus filtering in the "sponge" and "proof" rooms.

In a peak month, York cools enough dough at National Biscuit Company's 4-city-block-long "baker's bakery" in Portland, Oregon, to girdle the globe!

To maintain Nabisco's ultra-high standards in this new plant—one of the world's most scientifically equipped and operated—York cooling equipment was chosen *throughout*—from the storing of raw materials to the cooling of dough to the packaging of the crackers in wax paper.

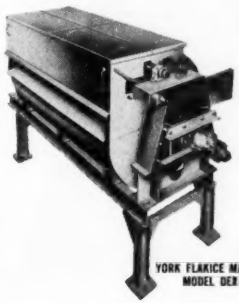


YORK FREON CONDENSING UNIT—5 HP.

◆ York Freon-12 condensing units cool storage spaces equal to 8400 ten-cubic-foot refrigeration units. 4 York 5-hp. Freon condensing units chill the icing in the "enrobers."

◆ A York V/W Ammonia Compressor—in the ingredient water system—lowers Portland city water to 33° F.

YORK V/W AMMONIA COMPRESSOR



YORK FLAKICE MACHINE MODEL DEX-150-A

◆ York FlakIce Ribbons cool the mixes in the preparation of certain baked goods.

● Even wax paper in storage is cooled by York to prevent damage from heat due to pressure.

Nabisco is only one of the many successful applications of York cooling equipment to food processing. Time and time again, from one end of a plant to another, York equipment is selected to do the job. From first cost to last, York is more economical . . . delivers a higher calibre performance. Up-to-the-minute managements profit from the product research and development that have made York the leader and pioneer in air conditioning and refrigeration.

When you need air conditioning or refrigerating equipment, call your York Representative (in your Classified Directory) or write York Corporation, York, Penna.

The big advances come from

YORK

Headquarters for— **Refrigeration and Air Conditioning**

Meat pans washed and sterilized on Stainless belt

● A nationally-known sausage maker safeguards the purity of his product by washing and sterilizing meat pans on a Cyclone Stainless Steel Chain Link Conveyor Belt. Much manual handling is thus eliminated . . . time and labor are saved . . . costs are lowered . . . high product-quality is maintained.

And the results in terms of time, labor and costs can be the same in your plant when you use Cyclone Metal Conveyor Belts for all processing operations. Cyclone has over 25 years of experience in fitting Conveyor Belts to varying requirements.

Write for your copy of Catalog No. 4, containing complete descriptions of Cyclone's three types of belt—Chain Link, Flat Wire and Flex-Grid. Or get in touch with the nearest Cyclone sales office.

CYCLONE FENCE DIVISION
(American Steel & Wire Company)
DEPT. H-81, WAUKEGAN, ILLINOIS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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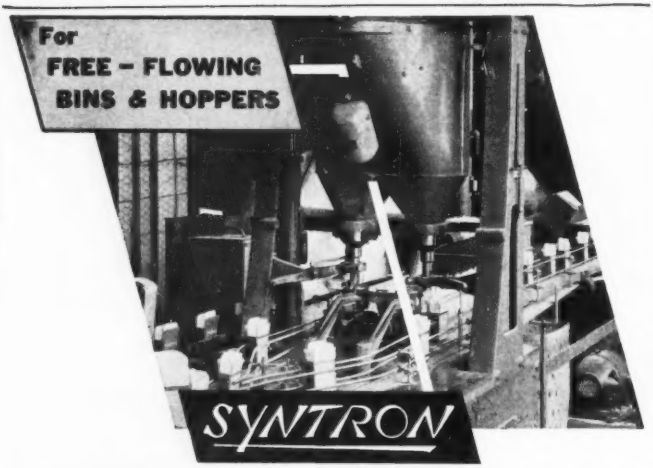
CYCLONE
METAL CONVEYOR BELTS
UNITED STATES STEEL



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ELECTRIC VIBRATORS

Their 3600 vibrations per minute break down arching and plugging whether it's a small 1-cu.-ft. packaging machine hopper or a big storage bin.

Send us a description of your particularly troublesome hopper — giving gauge or thickness of walls, cubic content, material being handled, etc. We'll be glad to submit a recommendation.

SYNTRON COMPANY
460 Lexington Avenue Homer City, Penna.

Schedule of Events

August

21–25—National Assn. of Sanitarians, 15th annual convention; Miami Beach, Fla.

September

3–13—International Chemical Conclave; Hotel Statler, New York City.
6– 7—6th annual dairy conference; Cornell University, Statler Hall, Ithaca, N. Y.
10–14—Instrument Society of America, 6th national conference and exhibit; Sam Houston Coliseum, Houston, Tex.
19–21—Dairy Products Institute; University of Minnesota, St. Paul Campus, St. Paul, Minn.
21–25—American Meat Institute, 46th annual meeting; Palmer House, Chicago.
26–29—International Assn. of Milk & Food Sanitarians, annual meeting; Hotel Colorado, Glenwood Springs, Col.

October

Sept. 30–3—Tea Assn., annual convention; The Greenbrier, White Sulphur Springs, W. Va.
1– 4—Society of Industrial Packaging & Materials Handling Engineers, 6th annual show; Public Auditorium, Cleveland.
7–10—National Bakery Supply Assn., annual convention; The Greenbrier, White Sulphur Springs, W. Va.
8–10—American Oil Chemists Society, fall meeting; Edgewater Beach Hotel, Chicago.
14–18—American Bakers Assn., annual convention; Hotel Sherman, Chicago.
22–23—American Butter Institute, annual convention; Drake Hotel, Chicago.
22–24—Packaging Institute, 13th annual forum; Hotel Commodore, New York City.
22–24—International Assn. of Ice Cream Mfrs., 49th annual meeting; Cadillac Hotel, Detroit.
24–26—National Pickle Packers Assn., annual meeting; Chicago.
24–26—Milk Industry Foundation, annual convention; Statler Hotel, Detroit.

Frozen diced carrots, new, proposed, page 6467, July 3 *Federal Register*, written comments received until August 2.

Dairy products, amending grading regulations, page 6494, July 4 *Federal Register*, effective July 1 (Applies to butter, cheese, and other manufactured or processed dairy products).

Frozen field peas and frozen blackeye peas, new, proposed, page 6571, July 6 *Federal Register*, written comments received until August 5.

Upgrade Milk Standards

F&DA intends to upgrade vitamin D content in the official standards of identity of evaporated milk to correspond with existing commercial practice—which provides for 25 USP units of vitamin D per fluid oz. of evaporated milk.

Also the new ruling will stipulate that if vitamin D is used, statement of this fact must appear immediately before or after the name "evaporated milk."

The present standard fixes the minimum at 7.5 USP units, and does not specify a definite location for statement of vitamin D content.

—End—

Lighting the Food Plant

—Continued from page 111

lighting equipment. Following are a few examples:

Sorting and canning[2] benches require 50 to 100 ft.-c. for precise sorting and detection of small defects at high speed. General lighting of 20 ft.-c., plus supplementary bench lighting, is a practical means of meeting this requirement. Fig. 1 illustrates typical layouts.

In a flour mill[1] a localized general lighting arangement has been found best for illuminating the roll floor. As shown in Fig. 2, dust-tight (Class II Group G) fluorescent luminaires are located to provide maximum illumination, without shadows, at the inspection locations on the roll stands. Luminaire type, location, and mounting height are important in this application. The I.E.S. study on this problem also indicated that color of light was important, and the daylight fluorescent lamp was termed best because maximum contrast is created between flour and impurities.

The mixing room of a bakery is another example of the requirement of specific lighting. Fig. 3 from the I.E.S. bakery report[3] illustrates the technic for properly lighting one or a group of mixing units.

In the modern dairy[4], one of the most difficult problems is the lighting of milk bottles as they are discharged from the washing machine. The operator must quickly detect cracks, dirt, foreign material and other defects. It has been found that all of these imperfections can be readily detected when the bottles are viewed against a luminous panel of low brightness.

References

1. "Lighting for Flour Mills," *Illuminating Engineering*, November, 1949.
2. "Lighting for Canneries," *Illuminating Engineering*, January, 1950.
3. "Lighting for Bakeries," *Illuminating Engineering*, June, 1950.
4. "Lighting In the Fluid Milk Division of the Dairy Industry," *Illuminating Engineering*, November, 1942.
5. "Lighting In the Candy Manufacturing Industry," *Transactions, Illuminating Engineering Society*, May 1937.

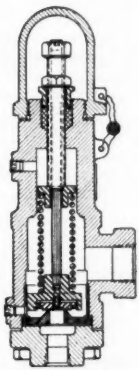
End (*Resume reading on p.* 112)

Now! A New Safety Valve, Built on a Better Principle

This improved equipment has the seat and moving parts of stainless steel; no danger of rusting fast! The parts are self-aligning and accurately made. The opening is full, giving the valve much greater capacity than earlier types.

Patent Pending

The new valve can be reseated after it opens. It meets the requirements of the latest A.S.M.E. and A.S.A. B-9 Codes. Built in ½", ¾", 1" and 1¼" sizes.



New Valve has Many Advantages: see Frick Bulletin 193.

Sensitive, dependable, and safe, this valve will give your refrigerating system the adequate protection you need.

Order today from your nearest Frick Branch or Distributor, or direct from

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WAYNESBORO, PENNA. U.S.A.

for • SPRAYING • WASHING • RINSING • COOLING • AIR CONDITIONING

Get the most out of your Spraying Equipment with minimum power . . . with efficient spraying.

Use Yarway Nozzles. No internal vanes or other restrictions to clog or hinder flow. Two types—Yarway Involute-type producing a fine hollow spray with minimum energy loss, and Yarway Fan-type producing a flat fan-shaped spray with time-saving slicing action for cleaning.

Wide range of standard sizes and capacities. Cast or machined from solid bar stock.

Thousands in use. Write for Bulletin N-616.

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KEEP CLEANING COSTS *in* LINE

with Longer Lasting

FULLER FIBER BROOMS

You can buy other brooms for less than the Fuller Fiber Broom. True economy can be measured only by the length of productive life of a product in relation to its original cost. For example — a broom that costs one-half as much as another is *not* an economical buy when it lasts only one-fourth as long. We believe that a test will convince you that Fuller Fiber Brooms — because they last 3 to 4 times longer—are cheapest in the long run. Write today to...

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In Canada: Fuller Brush Co., Ltd., Hamilton, Ont.

Animal Shortening

—*Continued from page 91*

In the first four trays (1-4 in drawing) the fat is agitated by stripping steam, injected through a perforated coil at the tray bottom. Steam not only purges the system of air but also removes from the shortening fatty acids and odor-producing and flavor-carrying volatiles.

A 25 deg. drop in temperature occurs in Tray 3, and another 25 deg. drop in Tray 4, both drops being due to the relatively low temperature (280-290 F.) of the agitating steam.

All trays are covered with perforated lids that permit steam and volatiles to escape but prevent any condensate from entering the trays.

In Tray 5 the fat is cooled by cold-water coils to 150 deg. F., the temperature at which it enters the drop tank.

Instruments Minimize Human Errors

In addition to the feed tank controls that regulate the flow of fat to the deodorizer, instruments control the time cycle of the operations, also the temperatures. Instrument recorded are the temperatures in Trays 2, 3, 4 and 5, also the vacuum maintained in the unit. An absolute pressure recorder indicates the vacuum in mm.

Conversion of a series of intermittent operations to continuous processing is the result of time-cycle control. Temperature in Tray 2 is kept below the danger point by temperature controls regulating the Dowtherm heating unit.

Advantages of Continuous Deodorizer

Chief gain through the use of this new high-temperature, high-vacuum deodorizer is the improvement in the product. There are other advantages. Alkali refining, a batch operation, is avoided, thereby reducing refining losses. Shallow tray processing also cuts refining losses because of minimum hydrolysis of fats.

Because the process is continuous, less building and floor space is necessary than for conventional processes. Man-hours, too, are less, because of instrument control and the continuous nature of the operations. And for the same reasons, steam and electric power are conserved.

How Product Is Finished and Packaged

Fat from the deodorizer is pumped through a closed-type filter for polishing. As the fat leaves the filter for temporary storage and cooling before packaging, an antioxidant (Tenox II) is added. In a stainless steel kettle, a

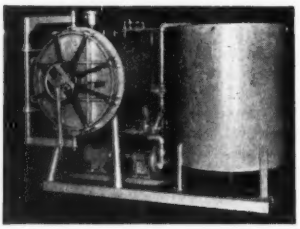
HERCULES FILTERS

FOR ALL TYPES OF

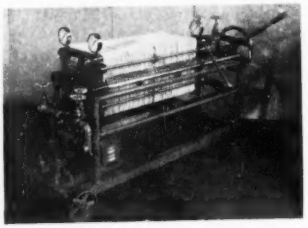
LIQUIDS

SUCH AS

- **Beverage Syrups**
- **Sugar**
- **Water for Beverages**
- **Wines, Beer, and Liquors**



Pressure Leaf Filters For Clarification by removal of particles in suspension at high flow rates.



Sheet Filters for ultra clarification or polishing.

●

Asbestos Pads and Loose Asbestos Fiber from our own Arizona mines, treated by a process that makes them commercially iron and calcium free.

●

Hercules fully equipped laboratories and experienced technical staff will help you solve your filtration problems.

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There's a
STAINLESS STEEL
SAN-I-TANK for every kind
of food processing and storage

For example, Type "J" is a single shell tank, available in capacities from 60 to 1000 gallons, that will take standard fittings of all kinds, is especially adapted for storage or mixing purposes.

Type "CHR" is a jacketed tank for heavy or light processing, for cooking or cooling, and equipped with the famous horizontal "wiping action" agitator.

Write today for Bulletin SS-50, which describes Type "J" and other single shell tanks in detail. Write for Bulletins CHR-50 and JS-50 for detailed information about jacketed tanks.

STAINLESS STEEL SAN-I-TANKS
METAL GLASS PRODUCTS COMPANY
BELDING 6, MICHIGAN

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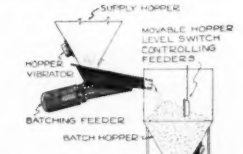
Hopper Level Switches
Serve A Dual Purpose

1 VOLUME CONTROL
Automatically maintaining full and empty levels of materials—fine or coarse—in bins and hoppers.

2 VOLUME BATCH WEIGHING



Natural angle of material repose causes switch to stop supply feeder and start discharge feeder.

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OF ANY STOCK YOU WANT TO PULVERIZE

We'll make a test grind with

SCHUTZ-O'NEILL PULVERIZER

You will receive our Engineering Report suggesting the best method to use and the type of Schutz-O'Neill Pulverizer and any receiving or sifting equipment suited to your requirements.

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When sending sample, be sure to State fineness desired.

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Processing Profit Stops With Inefficiency

Whether it's mechanization, materials handling, warehousing, or processing procedures, *efficiency* itself is the *profit factor* in any phase of the food industry.

Ferguson is aware that individual problems require specific treatment, therefore a *Ferguson First Team* . . . men carefully selected for their training and experience — men who work smoothly and effectively together, and *with your organization* . . . undertake first a preliminary investigation into your needs.

After careful analysis of your problems, recommendations for complete plant modernization may be made — the replacement of obsolete equipment, plant expansion, construction of new or added facilities may be advised, to affect increased volume at lower operating costs.

Investigate the Ferguson First Team method of cooperative effort. Preliminary discussions in confidence and without obligation.

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Uncooked Food for Thought

New, untrained, or day-dreaming personnel can cost you customers and money — by letting uncooked food slip by.

You can guard your quality and reputation with ATI Cook-Chex. These quality control tags attach to retort baskets right through your processing. They tell by an infallible color change when each batch is properly cooked, or which batch, if any, has been overlooked.

Certainty is assured every time, no matter what your cooking time or temperature. Simple to use. Savings in spoilage far outweigh the tiny cost. Send for samples *now*.

ASEPTIC-THERMO INDICATOR COMPANY

BATCH No._____
RETORT No._____

ATI COOK-CHEX COOK CHEX

THE COLOR-CHANGING **QUALITY CONTROL TAG**

USED BY THE WORLD'S LEADING FOOD PROCESSORS

Write for Free supply of samples for trying in your own retorts

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Send samples of ATI Cook-Chex and valuable quality control data.

My Name .....
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City ..... State .....

measured amount of antioxidant is mixed with a measured amount of shortening to form a concentrated preparation. This is injected into the shortening line (by a positive displacement pump) to provide the proportion—8 oz. antioxidant per 1,000 lb. of shortening. As needed, antioxidized shortening is pumped from intermediate storage, through coolers, to Votator plasticizers, in preparation for packaging.

The product is packaged, by volumetric filling machines, in 1 lb. cans and 3 lb. cans for retail store distribution. For bakers and other industrial users the shortening is packed in 50 lb. cans and 400 lb. drums.

Demands of the industrial market—particularly the call from bakers for shortening tailored to specific needs—prompted the installation of a modern bakery product laboratory at the packing plant. Addition of baking technicians and chemists to the meat research and quality control staff was then necessary.

The bakery laboratory serves a dual function. It develops both consumer and industrial formulas for use of the shortenings, and it carries on research concerning customer problems. The laboratory also demonstrates the use and values of the various shortening products.

General Characteristics of Product

Although the specifications may be varied seasonally and also to meet special requirements, the shortenings have approximately the following properties:

1. Smoke point, 465 deg. F.
2. Melting point, approximately 124 deg. F.
3. Free fatty-acid content, .028 percent
4. Stability, 70-80 hr. (activated oxygen method)
5. Freedom from odor or taste
6. Greater digestibility than most other cooking fats
7. Long shelf life without deterioration

Because of these properties the shortening does not impart flavor to any foods, nor give off disagreeable odors under any frying conditions. Amount of fat absorbed by foods fried in it is low and the surface of the foods non-greasy.

For institutions and housewives, it has the advantage that different foods can be fried in the product with no transfer of flavor from one to the other. For industrial users, it offers the asset that less animal product is required than conventional vegetable shortening in achieving the same results.

End (*Resume reading on p. 92*)

FLORASYNTH

OIL BITTER ALMOND FFPA

Imported from France

FREE FROM PRUSSIC ACID

A product guaranteed for its purity and uniformity . . . suitable for all your requirements.

FLORASYNTH

SPICEAROMES

BLACK PEPPER
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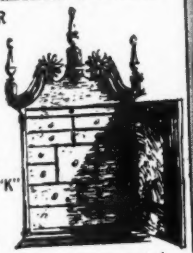
GARLIC
RED PEPPER
SWEET PICKLE
SPICEAROME "M"



Highly concentrated water miscible flavors ready for use "as is"

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BUTTER FLAVOR *Specialties*

CAPRYL BUTYRIC ACID
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(Syntharome Imitation Butter Scotch Flavor)
DIACETYL
• IMITATION BUTTER SCOTCH BASE
• RUM AND BUTTER CONCENTRATE
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2 A practical coverage of industrial piping, giving valuable information on **what kinds** of piping and fittings can be used most efficiently, and **where.** Presents the information for each service—water, gas, steam, etc.—in a separate chapter, covering pertinent methods of flow calculations, commonly used materials, fittings and valves, etc. Includes data and facts on techniques for determining pipe sizes and pressure drops, methods for estimating piping costs, developments in piping materials, such as alloys and plastics. **By Chas. T. Littleton, Formerly En'r in Charge of Piping, Am. Chemical Co. 394 pages, illus., $8.00**

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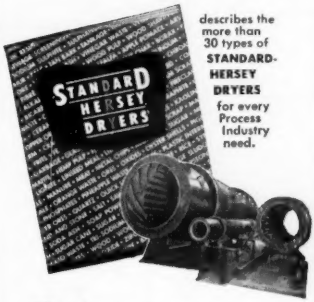

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Fig. 645

Are your scrubbing nozzles as efficient as you think they could be? Do they resist the corrosion or wear conditions satisfactorily—produce the breakup and distribution you would like?

Outline your spray problem for use—if your liquid can be sprayed with direct pressure at all—Monarch can furnish the nozzles.

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Here's the new Hamilton Tilting Type Mix-Cooker which has every feature of the regular Tilting Kettle PLUS the added feature of a bottom draw-off valve. Products being cooked can be drained off either through rim lip or through bottom valve, depending on viscosity of product.

The steam jacket on this Hamilton Tilting Kettle covers ⅗ of kettle area. Fabricated in stainless steel in gauges required by ASME Code or heavier. This kettle is available with single or double motion agitator with maple or nickel alloy scrapers—plus a Hydraulically lifted agitator arm. Any combination available upon specification.

HAMILTON Copper & Brass Works, Inc.
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Men & Companies

Industry

American Dry Milk Institute, Inc., through Executive Director D. W. Fairbanks, has named John T. Walsh as assistant director. Mr. Walsh has been with ADMI for 13 yrs.

Birds Eye Div. of General Foods is planning to erect a new building near Richmond, Va., with equipment to wash and chill lima beans for shipment to the packing plants.

Blaw-Knox Co. has received a contract from Southland Cotton Oil Co. of Paris, Tex., to furnish a soy bean extraction plant at Jackson, Miss.

California Fruit Growers' Exchange has launched its new Sunkist canned and frozen citrus juice products in Southern California and intends to enter the New York market this month. New products include lemon juice, lemonade, orange juice, orange ade, grapefruit juice, and a blend of grapefruit and orange juices.

Clinton Foods, Inc., has elected Nathaniel B. Barclay as president of Snowcrop Marketers Div. And Joseph M. Waters has been named Snowcrop vice-president in charge of sales and marketing.

Curtis Candy Co. intends to increase the size of its nickel "Baby Ruth" candy bar 22 percent without increasing the price.

Johnson Nut Co. has expanded its Portland, Ore., plant and has installed new equipment that reportedly will make its output equal to that of the company's home office plant in Minneapolis.

Power Custer has been named director of industrial relations for Kellogg Co.

Carl J. Moroney has been elected chairman of the board of Spreckels Sugar Co., San Francisco.

Libby, McNeill & Libby is constructing modern offices atop its warehouse in San Francisco. The new 25,000 sq. ft. of office space will increase present floor space by one-third.

Minute Maid Corp. recently announced the following appointments: Robert A. Fender, director of food operations: Henry Cragg, director of manufacturing; B. M. Middlebrooks, manager of manufacturing; H. Schwartz, manager of company's technical services and by-products; and Robert L. Rigley, director of public and industrial relations.

E. R. Mollner Co., firm of food chemists, has completed plans for a new plant that is expected to more than double the capacity of its present installation.

Pratt Phillips & Son, tomato plant that has been idle for the past two years, will resume operations as Salisbury Canners, Inc. The new company has been formed by the owners of Steinfeldt-Thompson Co., Inc., of Dania, Fla.

Reid-Murdoch, division of Consolidated Grocers, Inc., has named Frank E. Walker president. He succeeds Albert T. Flynn, who recently was named president of Consolidated Food Processes, Inc.

River Brand Rice Mills, Inc., has elected to its board of directors J. T. Foster and F. H. Schroeder, both vice-presidents of Lee Igenson Corp.

S. & W. Fine Foods, Inc., plans to build new warehouses in Berkeley, San Francisco, and Seattle as soon as permission is received from

STRIP CUT and DICE

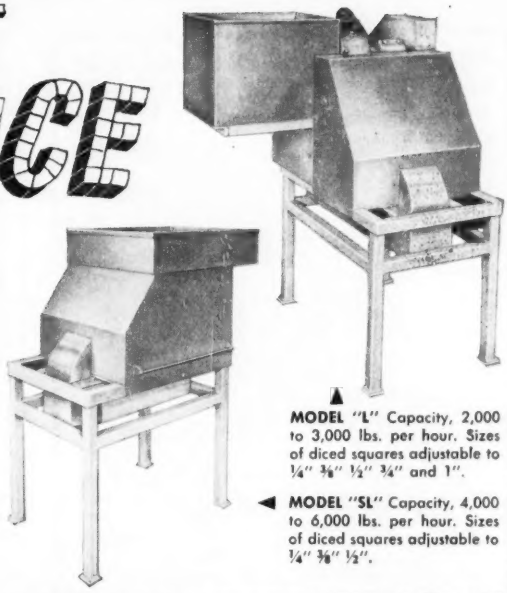
. . . without "Chipping" loss

Cutting relatively flat products through their thickness on conventional units results in "chipping" loss.

Urschel Models "L" and "SL" **completely flatten the product—then cut it into squares,** thereby reducing "chipping" to a minimum.

For greater cutting yield, check into Models "L" and "SL" for beef, pork, chicken, turkey, mutton, salt pork, bacon rind, frozen and parboiled meats, celery, peppers, clams, mushrooms, orange, lemon, grapefruit peel.

Get the full benefit of Urschel's years of food cutting experience for your special cutting problem. Write:



▲ **MODEL "L"** Capacity, 2,000 to 3,000 lbs. per hour. Sizes of diced squares adjustable to ¼" ⅜" ½" ¾" and 1".

◀ **MODEL "SL"** Capacity, 4,000 to 6,000 lbs. per hour. Sizes of diced squares adjustable to ¼" ⅜" ½".

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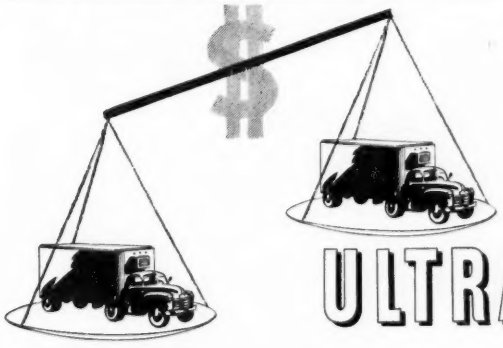
manufacturers of precision, high speed cutting equipment for delicate food products



Have you WEIGHED the advantages of ULTRALITE insulation?

Heavy insulation in a refrigerated truck or trailer costs somebody money—the shipper or the trucker. For "deadweight" puts an added strain on the motor, wastes power and fuel, may even cut down on the payload.

That's why shippers and truckers have gone overboard for Ultralite, the long glass fiber insulation. This superb insulation of fine textile-type glass fibers offers exceptional thermal protection—and it adds almost nothing to the travel load! What's more, Ultralite stays put *permanently* in walls, ceilings, and floors. Over the roughest roads, it won't shake down, settle, pack, or disintegrate. Ultralite won't burn or rot; won't support rodents, insects or bacteria; won't pick up odors.

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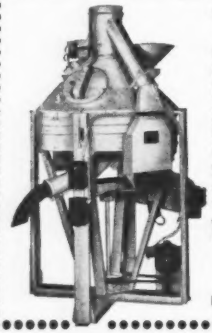
Also, distributors conveniently located in major cities.

HERE'S THE ANSWER TO ORNERY CLEANING AND CLASSIFYING JOBS

If, for example, you are making edible corn products, you want to rid the kernels of ferrous objects, stones, cob fragments, and unmentionable foreign materials. If you are making puffed cereals, you want to remove the hard, tough grains, metal fragments, black germs, and chaff.

Whatever dry food materials or products you are processing, you can probably clean and classify them with the new Model Bauer No. 208-2 Specific Gravity Separators.

The model illustrated (No. 208-2AA) is used for cleaning shelled peanuts, shelled corn, coffee, and oil-bearing seeds. It's one of seven standard models—and we also build special models to meet special situations.



Our Bulletin F-16 gives detailed information on these machines and their installation. It also offers you our laboratory service to show what can be done with a test run of your particular materials.

Ask for a copy of the bulletin now while the subject is on your mind.

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Curved Fingers —snug fit to hips
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Light Weight— greater finger sensitivity
Permanently Solinized Lining— easy on, easy off

Easy-to-wear Whitecaps speed production in food handling, other jobs where sanitary cleanliness is vital. Also in handling small parts—workers really *see* small dark pieces in assembly and inspection, and *feel* 'em, too! Whitecaps won't smudge white products. For heavier jobs—regular white Stanzoils, light, medium, heavy weights. All of white DuPont neoprene, long lasting in oils, acids, caustics. Buy white Stanzoils from your supplier, or write today for complete information and prices.

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STANZOIL PIONEER

OVER 30 Years OF QUALITY GLOVE MAKING

Don F. Copell has been appointed vice-president in charge of engineering and personnel for Wagner Baking Corp. Mr. Copell was formerly the company's chief engineer.

---

the National Production Authority.

Sun Harbor Co., San Diego, is currently engaged in filling a government order for 45,000 cases of tuna for the Armed Forces.

Personnel

M. A. Briggs was installed recently as president of the National Soft Wheat Millers Assn., at the opening of its two-day spring meeting at the Hotel Roanoke, Roanoke, Va.

Charles H. Brokaw has left his job as chief, chemistry section, research and development div. of Minute Maid Corp., to become chief of quality control of that firm.

R. C. Hoth has been appointed national sales manager of Allied Grocery Div.

C. T. McCutcheon has been named manager of H. J. Heinz Co.'s mid-west headquarters at Detroit. He will head sales, warehousing and distribution of eleven Heinz branches in Indiana, Kentucky, Ohio and Michigan.

Harold B. Manning has resigned as president of the Weston Biscuit Co., Cambridge, Mass., and will be succeeded by Garfield Weston, chairman of the board.

Oscar G. Mayer recently received an honorary degree of Doctor of Laws at the University of Wisconsin's 98th annual commencement.

William J. Mead, secretary of Master Bakers Assn. of Greater Boston, has become regional manager of the National Yeast Corp., succeeding Bernard Ings, who is on leave of absence.

Hugh H. Mottern has been appointed manager of Kraft Foods' Research Laboratories in Glenview, Ill. He was formerly director of research of the H J. Heinz Co.

Charles Paino, president of the National Assn. of Retail Ice Cream Merchandisers, is new president, treasurer and director of operations of Dairy Centers, Inc., with headquarters in Charlotte, N. C.

Harris Perlstein is new president of the Hoffman Beverage Co., succeeding Rudolph Pabst who will remain as member of the board. Mr. Perlstein is also president of the Pabst Brewing Co.

Albanus Phillips, Jr., has been re-elected president of Phillips Packing Co., Inc. Theodore Phillips was elected executive vice-president.

C. V. Rupp has been appointed manager of the Grand Rapids branch office of National Biscuit Co. He has been with the company since 1930.

Warren Saunders has been named vice-president and sales manager of Green Spring Dairy, Baltimore.

Dr. Milner D. Schaefer, fisheries expert from U. S. Fish & Wildlife Service in Hawaii, heads the research staff of the Inter-American Tropical Tuna Commission, with headquarters at the University of California's Scripps Institution of Oceanography.

Howard W. Ullman has been elected president of the Red Top Brewing Co., Cincinnati. He succeeds his father, Louis Ullman, who will continue to serve as chairman of the board.

C. W. Cook has been transferred to the newly created position of product manager with marketing responsibility for instant coffee, Maxwell House Div., General Foods.

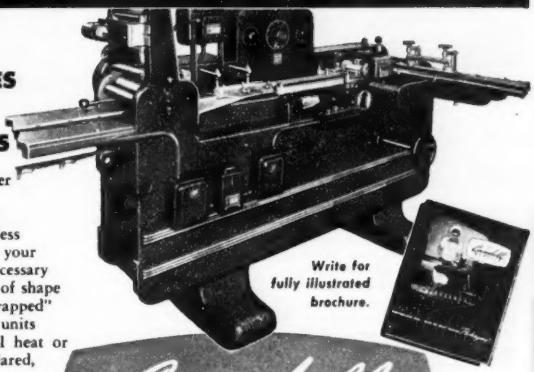
Here's a baker's helper

THAT SPEEDS WRAPPING PRODUCTION AT NEW LOW COSTS

PACKAGES CAKES COOKIES • BISCUITS CRACKERS • SPECIALTIES

With the automatic Campbell wrapper you not only attain amazing new packaging speeds up to 120 units per minute — with fewer operators and less materials — but you greatly increase your products' "eye and buy" appeal, so necessary to modern merchandising. Regardless of shape or substance, your product is "float wrapped" in single or multiple, square-cornered units . . . *without breakage.* Longitudinal heat or glue sealing with end seals crimped, flared, or folded protects flavor and "oven-freshness", safeguards against dust and dirt, and prolongs shelf life. Machine uses materials of all types and can be furnished with any standard or custom design feed and delivery required.

Wraps products of all shapes . . . and numerous sizes



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HUDSON-SHARP MACHINE CO. • GREEN BAY, WIS.

Manufacturers of Aniline and Gravure Presses, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll Winders, Packaging Machines, Creepers and Tissue Converting Units.

New York office: 55 West 42nd St.

STEEL-PARTS Mfg. Co.

Solves Your Problem with "METALOK" Lightweight Roller and Skate Wheel Conveyors

• Steel Parts — famous for custom engineered steel belt conveyors — offers the new Steel Parts Metalock lightweight roller and skate wheel conveyors. These new low cost ball bearing gravity conveyors will cut handling costs and speed production because they are engineered to do your job with maximum efficiency. Get full details on these new Steel Parts Metalock lightweight gravity conveyors NOW.

Find out why more major companies are using Steel Parts conveyors — MAIL this coupon NOW.

A few choice territories are still available — Write for details

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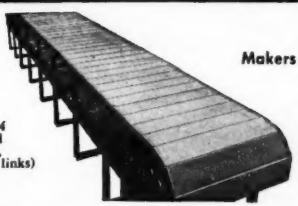

Model 614 Illustrated (6" pitch, 14 gauge links)

STEEL-PARTS

Makers of America's Most Complete Line of STANDARD STEEL BELT CONVEYORS

Steel-Parts steel belt conveyors give you a clean, flat sagless surface of steel . . . easy to clean, economical to use. If you need one conveyor or an entire conveying system — Steel-Parts have just the right unit, engineered to do your job best.

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- ☐ Please send me complete information, including engineering data on your new Gravity Conveyors.
- ☐ Send full details and specifications, including engineering data, on your Steel Belt Conveyors.
- ☐ Have your engineer call to discuss our problems.

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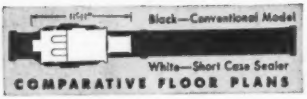
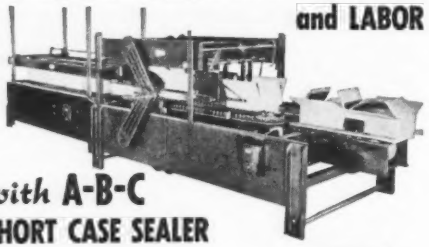


Save FLOOR SPACE and LABOR

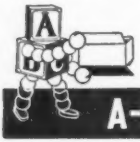


with A-B-C SHORT CASE SEALER

Save two-thirds of your valuable floor space with the A-B-C Short Case Sealer—with increased packaging efficiency, more speed, less expense . . . Automatically glues, folds and seals either or both top and bottom flaps of shipping cases in one operation. Made in eight models to fit any production requirement. Hot air heaters dry the glue in one-half the time. Speeds up to 30 cases per minute.

TOP QUALITY CASE HANDLING EQUIPMENT

Whatever your packaging job, A-B-C has a production proved machine for you—case sealers, unloaders and unscramblers, side sealers, and hand gluers.



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A-B-C PACKAGING MACHINE CORP. QUINCY, ILLINOIS

SALES ENGINEERS WANTED

By company manufacturing a broad line of stainless steel dairy and food processing equipment. Highest quality products are nationally known and sales coverage is on a national basis.

Newly developed products and high buyer interest warrant employment of additional sales representatives. Most men in our sales organization are college graduates and have been associated with our company for many years. We are looking for men with real creative ability who would like to become associated with a well established, financially responsible company. If qualified, please send full particulars, including a returnable photograph, to

SW-1285, Food Engineering

520 N. Michigan Ave., Chicago 11, Ill.

Employees of our organization have been informed of this advertisement.

Dr. Byron H. Webb has accepted appointment as senior scientist with National Dairy Research Laboratories, and will act as scientific advisor on the staff of Dr. Arnold H. Johnson, director of research. Dr. Webb was principal dairy technologist at the U. S. Bureau of Dairy Industry.

Norbert H. Woebkenberg of H. Woebkenberg Dairy, Reading, Ohio, has been chosen president of the Cincinnati Dairy Technology Society.

Marion Young, manager of private sales div. of the fresh fruit department of Florida Citrus Mutual, has resigned to become western division manager of Florida Citrus Exchange.

Associated Industry

Allis-Chalmers Manufacturing Co. recently announced a $1,000,000 expansion and improvement program for its Norwood, Ohio, plant. Plans call for construction of a new foundry and warehouse.

American Can Co. will build a new metal-container plant near Harrisburg, Pa., to service the fruit and canning industries in eastern and central Pennsylvania and the Appalachian areas of Maryland, Virginia and West Virginia.

Bemis Bro. Bag Co., was recently awarded the certificate of cooperation by the Economic Cooperation Administration for "furnishing assistance to the peoples of the Marshall Plan countries, to aid them in maintaining individual liberty, free institutions and peace."

Cedargreen Frozen Pack Corp. has announced the resignation of Vice-President W. O. Cedargreen. R. W. Day, formerly production manager, has assumed Mr. Cedargreen's former position as manager of the Wenapchee, Wash., plant.

Chain Belt Co. has appointed these five new district sales engineers: Edward D. Williams, C. J. Hammel, R. W. DeMott, Jr., Kenneth Bruch, and George Robichaud.

Continental Can Co. has opened its new $2,000,000 can manufacturing plant at Terminal Island, Calif., to serve fish canners in Southern California. In 1952, the plant expects to turn out about 400,000,000 cans for sardine, tuna mackerel packers.

Crane Packing Co. has started construction of new general offices and plant facilities, in Chicago. These accommodations will cover 133,000 sq. ft.

Gault Davis is new director of food processing of Amino Products Div., International Minerals & Chemical Corp.

Fosgate Growers Cooperative, Orlando, Fla. and **Patrick Fruit Corp.,** Sanford, Fla., have announced a mutual assistance pact to interrelate interests of the two organizations, while leaving the latter corporation with complete identity. Fosgate will provide processing and packing facilities.

Olin Products Co., Inc., has made these three managerial appointments: Benjamin H. Heim, middle atlantic states and southern division manager; Charles F. Pfeifer, New York and New England division manager; and George R. Johnson, manager of eastern converter sales.

Timken Roller Bearing Co. has announced appointment of R. A. Schimpf as chief works engineer.

Deaths

Ralph Altman, 43, district manager of A. C. Legg Packing Co., Wilson, N. C.—June 7.

Louis Bloch, chairman of the board, Crown Zellerbach Corp., San Francisco.—June 12.

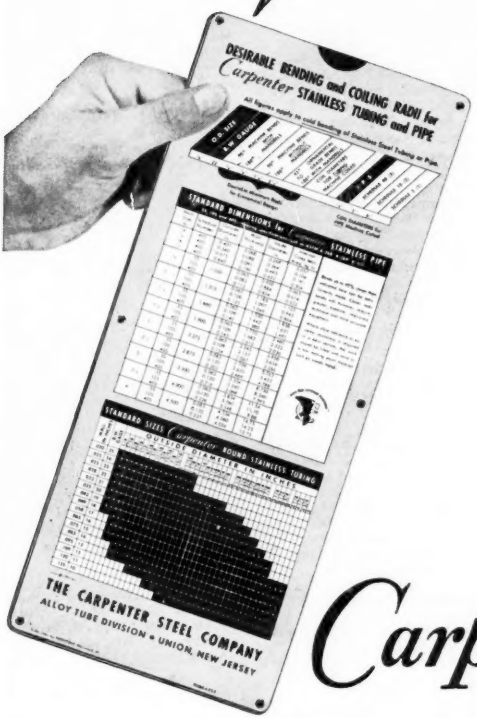
Charles C. Caldwell, 85, vice-president of Taylor & Caldwell, Inc., Walkerton, Va.—June 8.

C. A. Felvey, 61, vice-president, Dixie Container Corp., Richmond.—June 4.

Mark Morton, 92, co-founder of Morton Salt Co., Chicago. —June 24.

Dr. H. P. Stuckey, 71, director of Georgia Experiment Station, Blairsville, Ga.—June 14.

New *Carpenter* Slide Chart contains useful data on STAINLESS TUBING and PIPE


DESIRABLE BENDING and COILING RADII for
Carpenter STAINLESS TUBING and PIPE
STANDARD DIMENSIONS for Carpenter STAINLESS PIPE
STANDARD SIZES Carpenter ROUND STAINLESS TUBING
THE CARPENTER STEEL COMPANY
ALLOY TUBE DIVISION • UNION, NEW JERSEY

To help you conserve Stainless and get best results from the tubing and pipe you use, Carpenter has prepared this handy slide chart. It contains data on economical tube bending radii and coil diameters for light-walled Schedule 5 pipe.

This Carpenter Slide Chart gives you—

Bending radii for Stainless Tubing (with and without mandrels)

Coil diameters for Stainless Pipe (Schedules 5, 10 and 40)

Technical data on
- Tensile Strength
- Rockwell Hardness
- Heat Resistance
- Thermal Conductivity, etc.

How to Get Your Copy of the New Carpenter Stainless Tubing Slide Chart

Just drop us a note on your company letterhead, and we will be glad to send you a copy of this useful slide chart. You can use it to conserve critical material by getting best possible results where you use Stainless Tubing or Pipe.

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Department, Reading, Pa. "CARSTEELCO"

Carpenter
STAINLESS TUBING

— guaranteed on every shipment

Recent Inventions

Bleaching Agent for Flour Made by Precipitating Benzoyl Peroxide With Finely Divided Starchy Material, Separating and Drying—*W. A. Mitchell, Cedar Grove, N. J., to General Foods Corp., New York.* No. 2,535,313. Dec. 26, 1950.

Coarsely Ground Meat Braised at 170 to 200 deg. F., Reground to Finer Size, Canned With Its Juices, Sealed Under Vacuum, Processed at 212 to 240 F. in Absence of Air—*R. R. Fulton to Armour and Company, Chicago.* No. 2,535,405. Dec. 26, 1950.

Ice Cream Mix and Like Frozen in Continuous Manner During Passage Through Cylindrical Chamber Surrounded by Compressed Liquid Refrigerant—*C. R. Stoelting, Oconomowoc, O. E. Stamberg, Waukesha, and E. F. Vilter, Milwaukee, Wis., to Industrial Research Laboratories, Milwaukee.* No. 2,535,462. Dec. 26, 1950.

Confectionery Strip-Icing Applied Mechanically—*C. Hettinger, West Englewood, N. J.* No. 2,535,573. Dec. 26, 1950.

Cheese Press Made of U-Shaped Trough With Hydraulic Cylinder At One End, and Piston Working in Horizontal Plane—*P. Mueller to Paul Mueller Co., Springfield, Mo.* No. 2,535,592. Dec. 26, 1950.

Unrendered Fats Treated With NDGA to Inhibit Oxidative Rancidity—*A. Fonyo, La Grange, Ill., to Wm. J. Stange Co., Chicago.* No. 2,535,910. Dec. 26, 1950.

Curd Drained and Washed in Revolving Perforated Cylinder—*B. S. Harrington to Armour and Company, Chicago.* No. 2,536,054. Jan. 2, 1951.

Fish Steaks and Like Mechanically Removed From Storage Conveyor and Transferred Through Feeder Tunnel to Can Filler—*J. P. Jakob, Roselle, N. J., to American Can Co., New York.* No. 2,536,060. Jan. 2, 1951.

Continuous Flow of Milk Through HTST Pasteurizer Regulated for Time and Temperature by Recording Instrument Control—*R. N. Perkins, Brookline, Mass., to The Foxboro Co., Foxboro, Mass.* No. 2,536,082. Jan. 2, 1951.

Canned Evaporated Milk and Like Heat-Treated in Medium of Steam and Non-Condensable Gas to Avoid "Burn-On"—*P. C. Wilbur, San Jose, Calif., to Food Machinery & Chemical Corp.* Nos. 2,536,115, and 2,536,116. Jan. 2, 1951.

Frozen Buttermilk Made to Consist of Cream Having Approximately 50 Percent Fat and Sweetening Agent—*N. H. Lundquist, Rochester, Minn., to Cresthaven Farms, Minneapolis, Minn.* No. 2,536,137. Jan. 2, 1951.

Chewing Gum Chicle Coated With Plurality of Sugar Layers, Each Containing Water Soluble Amphetamine Salt and Protected by Waterproof Wax Coating—*T. C. Goggin, Pitman, N. J., to Clark & Clark Co., Wenonah, N. J.* No. 2,536,168. Jan. 2, 1951.

Amino Acid Hydrolysates Prepared From Yeast Protein by Action of Protease in Presence of Water—*L. A. Hall and L. Sair, to The Griffith Laboratories, Inc., Chicago.* No. 2,536,171. Jan. 2, 1951.

Apple Slices ⅛ in. Thick Treated With Ascorbic Acid to Penetrate Slices Preparatory to Freezing—*L. J. Harriss, Chicago.* No. 2,536,176. Jan. 2, 1951.

Lime-Treated Citrus Cannery Waste Dried for Stock Feed Derivative Containing 8 to 18 Percent Pectin—*D. B. Vincent to Dan B. Vincent, Inc., Tampa, Fla.* No. 2,536,240. Jan. 2, 1951.

Bread Dough Automatically Panned Under Mechanical Control—*I. M. Archer, Dallas, Tex., to Campbell Taggart Research Corp., Kansas City, Mo.* Nos. 2,536,249 and 2,536,250. Jan. 2, 1951.

Milk Fat Mixture Containing at Least 70 Percent Fat Mixed in Melted State With Standardizing Ingredients and Continuously Agitated During Cooling to Form-Retaining Condition—*I. J. Lundal and R. P. Robichaux, Chicago, to Sugar Creek Creamery Co., Danville, Ill., and Cherry-Burrell Corp., Chicago.* No. 2,536,297. Jan. 2, 1951.

Foam Type Confectionery Such as Marshmallow Made Continuously by use of Gaseous Diffusion Medium, Preliminary Impact Atomizing Operation, and Passage Through Porous Diffusing Agent to Globulize and Distribute the Medium Uniformly Throughout—*J. J. Alikonis, to Paul F. Beich Co., Bloomington, Ill.* No. 2,536,340. Jan. 2, 1951.

Fish and/or Offal Converted to Dry Meal and Oil by Continuous Method—*C. R. Bradford, Los Angeles, Calif.* No. 2,536,345. Jan. 2, 1951.

Starch Recovered From Ground Cereal Suspensions by Centrifugal Separation—*C. G. Eckers to Aktiebolaget Separator, Stockholm, Sweden.* No. 2,536,430. Jan. 2, 1951.

Dry Powdered Whey Mixed With Dry Non-Fatty Milk Solids Together With Semi-Solid Brewers' Yeast and Salt to Form Homogenous Granular Mass Free From Lactose Crystals—*W. P. M. Grelck, Baltimore, Md.* No. 2,536,439. Jan. 2, 1951.

Powdered Whey Mixed With Dry Non-Fatty Milk Solids, Semi-Solid Brewers' Yeast and Water to Form Paste Containing About 60 Percent Solids Packed in Airtight Containers—*W. P. M. Grelck, Baltimore, Md.* No. 2,536,438. Jan. 2, 1951.

Doughnuts Sugared by Mechanical Means Constructed to Recirculate Excess Sugar to Feed Hopper—*E. J. Roth, Rockleigh, N. J., to Joe Lowe Corp., New York.* No. 2,536,662. Jan. 2, 1951.

Edible Jelly Made From Calcium Alginate—*H. F. Angermeier, Essex Fells, N. J.* No. 2,536,708. Jan. 2, 1951.

Insides of Fish Conveyed on Rotary Drum Washed and Scraped by Mechanical Means—*C. E. Taus, Snohomish, Wash.* No. 2,536,826. Jan. 2, 1951.

Shortening Mixture Consisting of Steam Lard, Edible Beef Tallow and Lard Flakes Heated to 440-485 deg. F. in Vacuum and Held Above 425 With Agitation to Remove Free Fatty Acids, Oil Bearing Materials, and Carriers for Food Odors and Flavors, Then Cooled Under Vacuum—*E. G. Anderson, Hamilton County, Ohio, to The E. Kahn's Sons Co., Cincinnati.* No. 2,536,865. Jan. 2, 1951.

Canned Dietetic Fruits Made to Contain Saccharin and Pectin in Proportions of 1 to 15—*C. A. Weast, Manteca, Calif.* No. 2,536,970. Jan. 2, 1951.

Wine Made by Continuous Fermentation—*V. M. Cremaschi, Buenos Aires, Argentina.* Nos. 2,536,993 and 2,536,994. Jan. 2, 1951.

Top Fed Rotary Blancher or Cooker With Product Pockets and Intermittent Steam Feed—*G. T. Hemmeter, Berkeley, Calif., to U. S. A.* No. 2,537,053. Jan. 9, 1951.

Process for Production of Riboflavin by Fermentation—*J. E. McClary, Clayton, Mo., to Anheuser-Busch, Inc., St. Louis.* No. 2,537,148. Jan. 9, 1951.

Method of Making Table Syrup With Corn Cobs by Boiling and Adding Small Amount Commercial Sucrose—*A. E. Sebring, Redwood Falls, Minn.* No. 2,537,192. Jan. 9, 1951.

Bottle Case With Interlocking Removable Bottom Panel—*R. H. Brady, St. Louis and E. O. Birkner, Pasadena Hills, Mo., to H. C. Reagan, M. V. Brady, and P. Sievers, St. Louis, and G. M. Birkner, Pasadena Hills, Mo.* No. 2,537,299. Jan. 9, 1951.

Shrimp Peeling Machine With Oscillating Base Roller and Side Nippers—*F. S. Lapeyre, New Orleans, and J. M. Lapeyre III, and E. Lapeyre, Houma, La. to Peelers, Inc., Houma.* No. 2,537,355. Jan. 9, 1951.

Grain Drying and Cooling Apparatus With Integrated Heating Elements—*R. W. Teeman and F. N. Kolberg, Sioux Falls, S. D., to Kolman Mfg. Co.* No. 2,537,379. Jan. 9, 1951.

Egg Carton With Shock Reducing Features to Prevent Breakage—*L. Schwartzberg, Chicago.* No. 2,537,374. Jan. 9, 1951.

Apparatus for Quick-Freezing Foods Using Liquid and Air Freezing Mediums—*C. A. Baker, Glen Ridge, N. J., and G. W. Mathews, New York.* No. 2,537,390. Jan. 9, 1951.

Ribbon Inking Mechanism in Fruit Marking Machines—*C. A. Collender, Chatsworth, Cal. to F. Ahlburg, Los Angeles.* No. 2,537,397. Jan. 9, 1951.

Flexible Bag Container for Preserving Perishable Foodstuffs Consisting of Copolymer Material Which Shrinks at Least 30 Percent When Heated in Water—*C. R. Irons and G. W. Stanton, Midland, Mich., to The Dow Chemical Co., Midland.* No. 2,538,002. Jan. 16, 1951.

Liquid Cooling Tank With Refrigerating Plate Maze—*H. W. Kleist, Chicago, to Dole Refrigerating Co., Chicago.* No. 2,538,015. Jan. 16, 1951.

Dump Bottom for Calandria Vacuum Pans—*J. Mair, Birmingham, Ala., to Goslin—Birmingham Mfg. Co.* No. 2,538,113. Jan. 16, 1951.

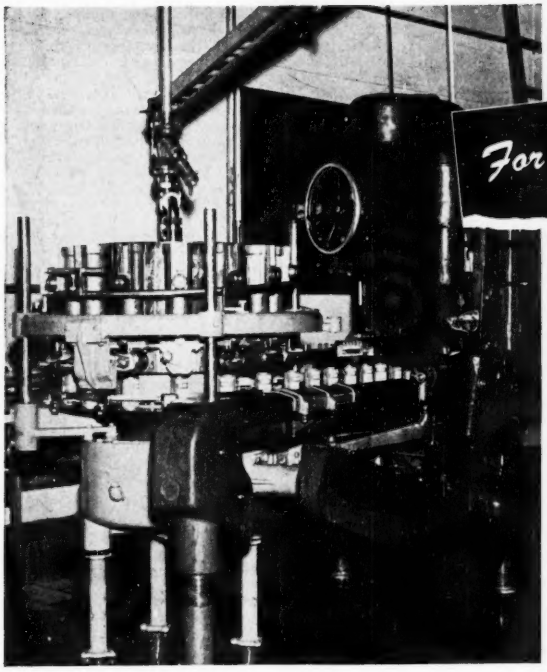
Chocolate Covered Fondant Containing Powdered Protein—*F. T. Kimball, S. Norwalk, Conn., to Orizar Products Inc., New York.* No. 2,538,202. Jan. 16, 1951.

Egg Washing Machine With Adjustable Track, Water Wash and Spirally Coiled Brushes—*R. H. Ruzsicska, Petaluma, Calif.* No. 2,538,331. Jan. 16, 1951.

Cooling Apparatus for Vegetables and Fruits Consisting of Cover Member to Support and Drain Refrigerant—*H. S. Goss, Fresno, Calif.* No. 2,538,362. Jan. 16, 1951.

Rectangular Cheese Hoop With Movable Sleeve—*H. J. Peters, Fond du Lac, Wis., to Damrow Brothers Co., Fond du Lac, Wis.* No. 2,538,379. Jan. 16, 1951.

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.



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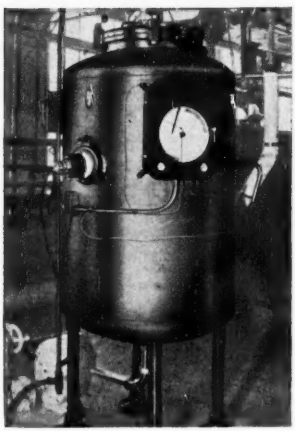

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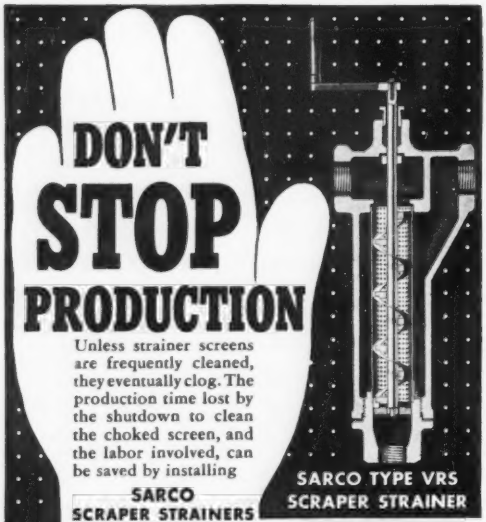

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Apparatus for Delivering Cans from Horizontal to Vertical Position—*G. W. Baker, and W. Conley, Jr., Milwaukee, and A. M. Olson, Wauwatosa, Wis., to Chain Belt Co., Milwaukee.* No. 2,538,408. Jan. 16, 1951.

Apparatus for Regeneration of Zeolite Softener Employing Brine Recovery System—*W. J. Hughes, Chicago, to Infilco Inc., Chicago.* No. 2,538,418. Jan. 16, 1951.

Rotating Shaft Can Washer—*F. Derbenwick, N. C. Calhoun, Oakland, Calif., and J. F. Ryah, Jr., San Leandro, Calif., to Gerber Products Co., Fremont, Mich.* No. 2,538,445. Jan. 16, 1951.

Rotary Feed Continuous Mixer With Tapered Outlet—*J. Marco, Wilmington, Del.* No. 2,538,465. Jan. 16, 1951.

Composition for Control of Mites and Insect Pests—*E. E. Kenaga, Midland, Mich., to The Dow Chemical Co., Midland.* No. 2,538,513. Jan. 16, 1951.

Distillation Apparatus With Rotating, Cooled Condensing Element and Means for Scraping Condensing Surface—*B. H. Thurman, New York, to Kraft Foods Co., Chicago.* No. 2,538,540. Jan. 16, 1951.

Traveling Band Bake Oven With Suction Vapor and Gas Draw-Offs—*E. Milner, Crossland, Culcheth, near Warrington, England, to T. and T. Vicars Ltd., Earlestown, Newton-le-Willows, England.* No. 2,538,355. Jan. 16, 1951.

Bread Wrapping Machine With Means to Form Tear Tab—*T. Jensen, Laurelton, N. Y. and F. A. Drury, Jersey City, N. J., to American Machine & Foundry Co.* No. 2,538,464. Jan. 16, 1951.

Citrus Fruit Juicer Which Quarters Fruit and Reduces Oil Cell Rupture—*R. Polk, Sr., Tampa, Fla., to Polk Development Co.* No. 2, 538, 590. Jan. 16, 1951.

Bakery Cake Tin Rack With Handle—*R. W. Wuollet, Minneapolis.* No. 2,538, 612. Jan. 16, 1951.

Ice Cream Freezer—*A. H. Wakeman, Crystal Lake, Ill., to Creamery Package Mfg. Co., Chicago.* No. 2,538,716. Jan. 16, 1951.

Package for Candy Canes—*C. J. Kunkler, Columbus, Ohio to R. L. Greene, Columbus.* No. 2,-538,730. Jan. 16, 1951.

Freezing Apparatus Employing Trays Automatically Fed and Removed With Guided Refrigerated Air—*V. C. Patterson, York, Pa., to York Corp., York,* No. 2,538,-734. Jan. 16, 1951.

Method of Homogenizing Liquid Foods Involving Homogenization, Separation Into Large and Small Component Sections and Rehomogenizing Large Particles—*O. E. Froding, Stockholm, Sweden to Aktiebolaget Separator Corp., Stokholm.* No. 2,539,125. Jan. 23, 1951.

Food Flavor Intensifier Consisting of Alcohol and Non-Toxic Glycol Solvent and Gentian and Ascorbic Acid Extract as Solute—*W. Phillips, North Arlington, N. J.* No. 2,539,160. Jan. 23, 1951.

Food Blanching and Freezing Device Consisting of Steam Heated Chamber, Cooler for Reclaiming Entrained Food Substances and Freezing Chamber—*H. J. Bierman, Chatham, N. Y. to Ingersol-Rand Co., New York City.* No. 2,539,226. Jan. 23, 1951.

Continuous Pasteurizer, Distiller or Sterilizer Consisting of Steam Addition and Vacuum Ebullation Chambers—*H. L. Murray, Auckland, New Zealand to Murray Deodorisers Ltd., Auckland.* No. 2,539,264. Jan. 23, 1951.

Method of Purifying Sugar Solutions by Adding Alkaline Hydrated Calcium Silicate to 40-60 Deg. Brix Clarified Juice, Heating and Filtering—*R. R. Bottoms, Crestwood, Ky., and E. E. Pittman, Elizabethtown, Ky. to National Cylinder Gas Co., Chicago.* No. 2,539,397. Jan. 30, 1951.

Mechanism for Feeding Can Ends Utilizing a Circularly Guided Finger—*W. Pechy, Manasquan, N. J. to American Can Co., New York City.* No. 2,539,467. Jan. 30, 1951.

Treatment of Tomatoes by Washing in Hypochlorous Acid Solution, Draining and Drying in Atmosphere of Nitrogen Trichloride—*D. E. Pryor, Whittier, Cal. to Wallace & Tiernan Products Corp., Bellville, N. J.* No. 2,539,470. Jan. 30, 1951.

Canned Food Retorting Method Using Compressed Air Through Steam Spreader Pipe to Effect Water Circulation—*G. F. Barnum, Pittsford, N. Y., and E. J. Hanna, Rochester, N. Y. to Taylor Instrument Co's., Rochester.* No. 2,539,505. Jan. 30, 1951.

Reel-Type Baking Oven With Ferris Wheel Pan-Holding Arrangement—*S. T. Howard, Jeffersonville, Ind.* No. 2,539,423. Jan. 30, 1951.

Can Capping Machine With Uninterrupted Flow of Covers and Containers—*J. P. Jakob, Roselle Park, N. J. to Continental Can Co., New York City.* No. 2,539,-427 Jan. 30, 1951.

Method of Stabilizing Chocolate Mixtures by Adding Polyoxyethylene Sorbitan Tristearate as Surface-Active-Dispersing Agent—*M. G. Mayberry, Pittsburg, Pa. to Fanny Farmer Candy Shops Inc., Rochester, N. Y.* No. 2,539,518. Jan. 30, 1951.

—*End*

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Literature states that easily-applied floor hardener facilitates maintenance of concrete or concrete-compounded surfaces.—*Flexrock Co., Philadelphia 4.*

Refrigeration

Information for computing refrigeration plate requirements is contained in Catalog 15 along with reference material pertaining to heat leakage, specific and latent heats of perishable foods, and average value for air infiltration loads.—*Kold-Hold Mfg. Co., Lansing, Mich.*

Plastic Packings

Bulletin illustrates and describes non-jacketed plastic packings that are claimed to be relatively inert with a high compressibility that provides positive sealing at high pressures while maintaining low pressure on the packing gland. 4 pages.—*Raybestos-Manhattan Inc., Packing Div., Manheim, Pa.*

Meat Packers Equipment

Stuffers, viscera tables and head splitters are detailed in 4 page leaflet.—*Cincinnati Butchers Supply Co., Cincinnati 16.*

Dehumidification

Subjects covered in new bulletin are: How to compute relative humidity, signs and results of too much humidity, how to remove moisture from the air, and recommended humidities. Also included are text and pictures covering moisture-removing machines.—*Abbeon Supply Co., Jamaica, N. Y.*

Sump Pump

A description of new line of vertical sump pumps is offered in Bulletin 4600A, along with construction illustrations, selection tables, and other data. Reported features: Heavy duty construction, close tolerance dowel-ring fitting from motor to impeller, and positive alignment of all rotating and guide bearing parts.—*Deming Co., Salem, Ohio.*

Heat Transfer Surfaces

Variety of specialized heat transfer services applicable to solvent recovery, inter-cooling, regeneration, gas separation, heat economizing and drying equipment is presented in 4-page Bulletin ID-151.—*Modine Manufacturing Co., Racine, Wis.*

Palletizing

Featured in new catalog is story of how an integrated materials-handling program was set up at Nabisco. New palletizing method is said to reduce damages, costs and inventory headaches. 12 pages. —*Acme Steel Co. of Canada, Ltd., Montreal.*

Tanks, Mixers

Photos, diagrams and information on stainless steel liquid processing equipment, including mixing and storage tanks, portable mixers, agitators, transfer pumps, and filters are presented in colorful 32-page catalog. Included are detailed drawings, parts lists, and application and performance data. —*Alsop Engineering Corp., Milldale, Conn.*

Determining Carbohydrates

Anthrone, a reagent for the determination of carbohydrates, is subject of 2-page bulletin. Uses, properties, and price of Anthrone are listed. — *Jasonols Chemical Corp., Brooklyn 6, N. Y.*

Stainless Steel

Pocket-size booklet explains nature and maintenance of stainless steel dairy and food plant equipment. Cleaning, polishing and disinfecting methods are outlined. 20 pages.—*Cherry-Burrell Corp., Chicago 6.*

Pump Motors

Well-illustrated 24-page booklet notes applications of large AC motors to centrifugal pumps, and the use of variable speed magnetic drive on pumping applications. Charts and diagrams are included. —*Electric Machinery Mfg. Co., Minneapolis 13.*

Wire Products

Spiral woven conveyor belts, wire screens and filter cloth are covered in a series of 4-page pamphlets. — *Cambridge Wire Cloth Co., Cambridge, Md.*

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Nut Processing Machinery

Bulletin 52 features nut roasters, blanchers, granulaters, picking tables, and peanut butter mills. Descriptions and illustrations of crushers, breakers, and other apparatus for handling lumpy or bulky materials (coconut shells, corn cobs, pressed cakes) also appear. 8 pages.—*Bauer Brothers Co., Springfield, Ohio.*

Incinerator

Waste disposal and waste recovery industrial incinerators are described and illustrated in six-page folder. Industrial usages range from those jobs imposing the hottest fires testing the structure of the unit, to those presenting the coldest charge demanding peak combustion efficiency.—*Brulé Incinerators, Chicago 5.*

Control Equipment

Humidity Recorder and Controller

Substance of Instrumentation Data Sheet 10.5-4 is humidity sensing element that operates with "ElectroniK" potentiometer, thereby providing direct relative humidity records. 4 pages.—*Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Philadelphia 44.*

Speed Reducer

Colorful bulletins A602B and A470A, respectively, outline single reduction and double reduction torque arm speed reducers. Installation data for selecting the right reducer for any application are offered.—*Dodge Mfg. Corp., Mishawaka, Ind.*

Voltage Regulator

Featured in 12-page Bulletin 5351 is line of standard automatic voltage regulators. Various instantaneous electronic and electro-mechanical units are illustrated with outline drawings and performance data.—*Superior Electric Co., Bristol, Conn.*

Steam Trap

Advantages reported for steam trap, covered in 16-page booklet, are universal installation and positioning, simplified piping, versatility, visible operation, compactness, and low maintenance costs.—*Velan Engineering Co., Jersey City, N. J.*

Pyrometer

Two portable pyrometers, applicable where temperatures of molten aluminum, zinc, lead, tin, brass and other non-ferrous alloys must be measured before pouring, are described in Bulletin PPY-1. Included is price listing.—*Wheelco Instruments Co., Chicago*

Vacuum Breakers

Recommended for use on closed vessels and lines from which fluid may be rapidly drained, vacuum breakers of bronze for standard use, or cast iron for special operating problems, are described, pictured, and diagrammed in bulletin.—*Minneapolis-Honeywell Regulator Co., Industrial Division, Philadelphia 44.*

Smoke Density Recorder

Details of device which records smoke density on 24-hr. charts are set forth in 4-page leaflet. Instrument should aid engineers or plant managers faced with fuel loss problems or rigid city smoke ordinances.—*Bailey Meter Co., Cleveland 10.*

Tension Linkage

Outstanding feature of tension linkage is that chain need not be an endless belt as in a power transmission drive. Bulletin 51-10 describes and pictures numerous examples of tension linkage applications.—*Baldwin Duckworth, Division of Chain Belt Co., Springfield 2, Mass.*

Speed Variator

Diagrammed and pictured in 5-page folder is adjustable speed drive unit with d.c. drive operating from a.c. power. Packaged motor generator set and controls, small space requirement, and flexibility are major advantages cited. Load, speed, braking, construction, control and protection features are listed in foldout chart.—*General Electric, Schenectady 5, N. Y.*

Motors

Line of single and polyphase motors are offered in Bulletin MU-185.—*Wagner Electric Corp., St. Louis 14.*

Materials Handling Equipment

Battery Charger

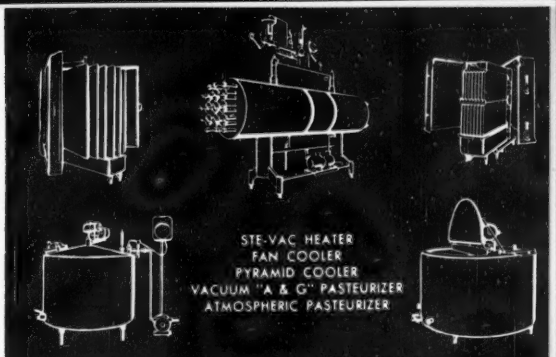
Leaflet describes automatic combination battery charger, for electric hand truck batteries, capable of charging a six-cell lead acid or a ten-cell Edison battery. It is designed for operation on either 115v. or 230v. input—*General Electric, Schenectady, N. Y.*

Trolley-Hoists

Plain and geared trolleys, recommended for service where close head-room assembly is required, are outlined in 2-page bulletin, with prices and capacities included.—*Wright-Hoist Div., American Chain & Cable Co., Inc., York, Pa.*

Lift Trucks

Data sheets give dimensions, drawings, capacities, and operating performance figures for pallet type, platform type, power tongue lift, and tractor and pusher type trucks.—*Lift-Trucks, Inc., Cincinnati 14.*

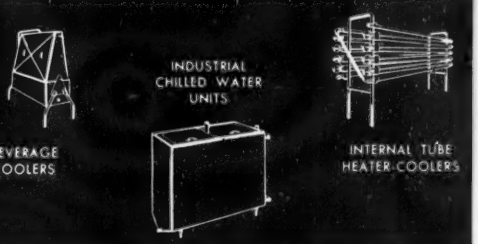


All the 32° Water You Can Use Instantly and with No Freezing Up

The Chester-Jensen Industrial Chilled Water Unit, thanks to its "short gas flow" principle, does more than provide 32° water *instantly*, without icing up. Because refrigerant gases have a shorter distance to travel, higher back pressures are possible. This means smaller compressors and reduced power costs. Yet temperatures are always uniform and automatically maintained.

Chester-Jensen Industrial Chilled Water Units can be operated as single pass, or recirculating coolers. They can be connected to your present compressors to increase their tonnage. Full details and recommendations will be gladly furnished on request.

In Chester-Jensen Industrial Chilled Water Units, the longest gas escape route can be no more than the diagonal of the cooler section. Capacity of this unit is 50 tons of refrigeration per hour. Length—86⅛"; Height—55"; Width—varies with capacity.



Chester-Jensen Company

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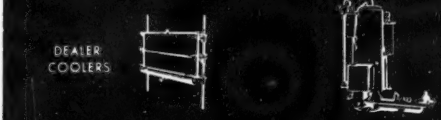

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Simplifies Bag Sealing and Labeling!

SEALS & LABELS IN ONE EASY OPERATION!

No staples, no pins, no hand work!

Simultaneously attaches labels and heat seals all suitable bag materials up to 6" wide; also seals to 10" wide. Cuts handling time; saves labor; **pays for itself in 6 months!** Insures tight pack even with oversize bags by folding tops first, if desired. Fast, safe operation with automatic Phantom Feed. Other Heat Seal-It Machines available. Write for circulars.

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3370 Robertson Blvd., Los Angeles 34, California

HEAT SEAL-IT Machines

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Get literature, catalogs or detailed information that you need from manufacturers of equipment, materials, supplies, ingredients.

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Wire Belting

Catalog 31 contains specifications, descriptions, power formulas and construction details on spiral-woven wire conveyor belts and complete conveyor systems. 40 pages.—*Korb-Pettit Wire Fabrics & Iron Works, Inc., Philadelphia 22.*

Lubrication Chart

Pocket-size 26-point lubrication chart covers eight industrial trucks, including turret-truck power unit, Models 20, 40, 75 and 150 fork-lift trucks, and M3 and MH3 straddle trucks.—*Hyster Co., Portland 8, Ore.*

Crane

Overhead handling equipment for heavy-duty lifting and loading is subject of well-illustrated booklet. Tram rail system is adaptable to inside or outside plant operations.—*Cleveland Crane & Engineering Co., Wickliffe, Ohio.*

Tire Conservation

Title of 8-page booklet is "Nine Ways to Get More Miles Out of Truck Tires." Text covering each method is terse. Included are truck tire load and inflation table and dual spacing table. Illustrations and diagrams appear. *B. F. Goodrich Co., Akron, Ohio.*

Plant Supplies

Gas Burning Nozzles

Combination of flame retaining nozzle and long-sweep elbow into a single unit is noted in Catalog 804D. Reported operating advantage of new unit is location or orifice in part of mixture stream where there is least difference in velocities, thus enabling nozzle to operate at lower manifold pressure without backfiring.—*Hauck Mfg. Co., Brooklyn 15.*

Stoker Conveyor

Savings in work, money and handling of fuels are advantages reported for boiler room stoker-feeder conveyor. Bulletin pictures and briefly describes uses of unit. —*American Coal Burner Co., Chicago 11.*

Wall Washer

Portable wall and ceiling washing machine is said to clean 5,000 sq. ft. of interior painted wall or ceiling surface in an 8-hr. day. Leaflet outlines advantages of low air pressure operated applicator.—*Ross & Story Products Corp., Syracuse 2, N. Y.*

Ladders

Featured in Bulletin 251-15 are steel ladders of many designs that incorporate a rubber-tipped leg with offset casters for either stability or easy movement.—*Ballymore Co., Wayne, Pa.*

Electric Oil Heater

For heating heavy grades of fuel oil with automatic control of oil temperature, heaters are reported to frequently eliminate need of long steam and condensate line extensions of new steam generating installations where steam is not available for heating oil. Oil heating rate table is included in Catalog 709.—*Hauck Mfg. Co., Brooklyn 15.*

Inspection Equipment

Variety of optical and illuminating equipment for inspection jobs—from simple, naked-eyed illuminated inspection to high power, close-tolerance microscopic examination—is offered in 8-page catalog.—*Arthur S. LaPine & Co., Chicago 10.*

Vacuum Calculator

Designed for quick calculations in vacuum research and processing work, slide rule vacuum calculator is now available for free distribution. Rule will determine needed pump capacity to evacuate a given volume to a specified vacuum in a given time, vapor pressures of water at various temperatures, and capacities of round tanks. Temperature conversion tables and a chart showing boiling points of various solvents under pressure appear on back of rule.—*F. J. Stokes Machine Co., Philadelphia 20.*

Miscellaneous

Corrosion Protectant

An explanation of new pigmented organic corrosion resistant coatings appears in 6-page folder. Pictures of various products and equipment protected with coatings are shown, together with a list of typical applications.—*S. C. Baer Co., Cincinnati 2.*

Strip Chart Recorder

Six permanent records of industrial processes may be obtained on one strip chart with new chart recorder. Bulletin MPC-1 illustrates basic recorder assemblies. 4 pages.—*Wilco Instruments Co., Chicago 7.*

Adhesives

Descriptions of several types of adhesives for export packaging are set forth in folder. Adhesives are stated to meet military specifications.—*Minnesota Mining & Mfg. Co., Detroit 2.*

Canning

Carried in special folder are a number of bulletins describing various can-making machines and attachments, including gang slitters, scroll shears, flangers, testers and body makers. Each bulletin describes a different line of equipment. — *Baldwin-Lima-Hamilton Corp., Philadelphia 42.*

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Chemical and biological analyses of food materials and products. Food plant design, inspection, process examination and control. More than 75 years of experience serving the food and beverage industries.
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We have a wealth of applied research for profits, production, available to the food industries.
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there is anything
you want . . .
that other readers of this paper can supply
or—
something
you don't want
that other readers can use, advertise it in the
SEARCHLIGHT SECTION

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO.
PHILADELPHIA, PA.
3 WAREHOUSES
Proper Temperature for Frozen Foods

New Advertisements
received by August 18th will appear in the September issue subject to limitation of space available. Address copy to the
FOOD ENGINEERING
330 W. 42nd St., New York 18, N. Y.

INGREDIENTS
For the Food Processor

CARROT OIL
makes foods
golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!
NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

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$1.20 a Line- Minimum 3 Lines.

To figure advance payment count 5 average words as a line.

EMPLOYMENT WANTED & INDIVIDUAL SELLING OPPORTUNITY undisplayed advertising rate is one-half of above rate, payable in advance.

PROPOSALS, $1.20 a line an insertion.

INFORMATION:

BOX NUMBERS count as one additional line.

DISCOUNT of 10% if full payment is made in advance of four consecutive insertions of undisplayed ads (not including proposals).

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

DISPLAYED RATE:

The advertising rate is $11.50 per inch for all advertising appearing on other than a contract basis. Contract rates on request.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page. F.I.

NEW ADVERTISEMENTS received by 10 A. M. August 22nd at the New York Office, 330 W. 42 St., New York 18, N. Y., will appear in the September issue subject to limitations of space available

GENERAL SALES MANAGER

Meatpacking company. Top caliber man for well established, quality house located in Northeast. Generous base salary plus bonus. Please telephone collect MUrray Hill 2-2636 (New York) or write Box

P-1487, Food Engineering
330 W. 42nd St., New York 18, N. Y.

FOOD CHEMISTS
JR. AND SENIOR

3 FOOD TECHNOLOGISTS $7,200.00
B'k'r'y Sups. exp. icings, etc.
FOOD TECHNOLOGIST—Ph.D., juices $6,500.00
EXECUTIVE CHEM. bio-chem. b'kgr'd. $8,000 00
Many Jr. Positions
Call, write or wire:—Gladys Hunting (Consultant)

DRAKE PERSONNEL
7 W. Madison St. Chicago 2, Ill.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (18)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

CHEMICAL ENGINEER: Large national firm in cereal field needs graduate chemical engineer with experience in food processing. Location in Minneapolis. Please state education and experience fully. P-9472, Food Engineering.

WANTED FOOD Technologist with exceptional educational background. Food experience preferred, not necessary requisite. Salary $4,000 to $6,000. Advise complete background experience and references. Position consists of research, quality control, and administrative duties. Answer P-9981, Food Engineering.

WANTED: MAN for managing salesmen on truck food distribution routes and buildings sales. Must be experienced in hiring and managing men. At present we operate seven trucks and expect to continually add more. This is a growing business and a wonderful opportunity for the right man. P-1054, Food Engineering.

SALES MANAGER for food industrial division of large industrial instrument manufacturer. Must have engineering background and comprehensive experience either in food processing or in the sale of process equipment to the food industry. Work involves directing sales and promotional activities with some field contact of major equipment manufacturers and food processors. Salaried position. Location Philadelphia. Replies will be considered confidential and should include complete resume of personal qualifications, work experience, and salary expected. P-1258, Food Engineering.

FIELD SERVICE Man: Large supplier of raw materials to the food industries, especially candy, ice cream, salad dressings and baking needs a food technologist with practical knowhow. Good trouble-shooter. Salary. Travel. Permanent. Needs sound technical background. Will acquire broad experience in food production. P-1353, Food Engineering.

WANTED: CHEMICAL Engineer by large national firm in food field. Needs Chemical Engineer with experience in quality and technical control of Food Processing. Eastern location. Please state education and experience fully. P-1469, Food Engineering.

MAINTENANCE MECHANIC: New England Packaging Concern. Energetic individual having creative ability, experienced with machinery for automatic packaging and filling of flexible films preferred. (Contract Packaging). Write stating experience in detail, as well as salary expected to P-1561, Food Engineering.

SELLING OPPORTUNITY OFFERED

SALESMAN:—EXPERIENCED in flexible film packaging field. Must have necessary qualifications to extend and build up Contract Packaging Department of a well-known progressive New England Packaging Concern. Unusual opportunity for an aggressive man to establish security. Write giving full details, as well as salary expected to SW-1562, Food Engineering.

POSITIONS WANTED

SANITATION ENGINEER—10 years experience Food Technology, quality control, Technical sales-service to Food-Dairy Industries. PW-1446, Food Engineering.

CHEMIST, PLANT Manager, 30, previous food, beverage, flavor and essential oil manufacturing experience, seeks new association in Greater New York City area. Presently employed. PW-1331, Food Engineering.

GENERAL OR Plant Manager—Processing, packaging of confectionery, food, similar. M.A. Bus. Admin. Organization expert. Age 41. PW-1452, Food Engineering.

ENTOMOLOGIST, PH.D. Wishes position with food processor interested in insect control and sanitation. Set up or fit into sanitation program. PW-1514, Food Engineering.

FOOD & DAIRY Executive. Experienced all phases management including personnel, purchasing, systems, production, packaging, analysis. Familiar large chain operations. Desire position with responsibility and future. Age 35, married, presently employed. Education Yale, Columbia. PW-1431, Food Engineering.

SPECIAL SERVICE

Photomicrographs

made to your requirements. Modern equipment. Prompt service. Samples on request. Fred Schmidt, Bedford Hills, N. Y.

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BUSINESS OPPORTUNITY

CANNING PLANT: Automatic — continuous equipment. Like new, complete. At sacrifice in Miami, Florida. Write P.O. Box 102, Miami 42, for full information.

WANTED

ANYTHING within reason that is wanted in the field served by Food Engineering can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

FOOD PLANT WANTED

We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets or stock of one of more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.

Address all replies
"Confidential" C. J. GALE, Sec.
233 Broadway, N. Y. 7, N. Y. BA 7-1819

COURSES IN FOOD TECHNOLOGY

a. Mathematics and Chemistry of Food Technology
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c. Nutrition
d. Canning
e. Freezing
f. Preserving
g. Inspection and Grading according to USDA standards
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RESTAURANT MANAGEMENT
GENERAL STUDY OF COOKING
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PIE AND PASTRY MAKING
CAKE DECORATING
STUDY OF MEATS

MEN OR WOMEN
VETERANS OR NON-VETERANS
DAY AND NIGHT CLASSES

Highly qualified instructors with practical experience as well as European and American degrees in their respective fields.

ATTENTION EMPLOYERS

If you need qualified personnel, such as: Food Technologists, Laboratory Technicians, Mold Counters, Foremen, Forelaidies, Graders and other trained personnel for Quality Control Work please contact the Employment Office of the school.

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An opportunity occurs which is quite unique, of acquiring an English Canning Factory efficiently equipped to handle 750,000 cans per week with essential facilities to sell that output. This undertaking enjoys an excellent can allocation, a generous meat ration and contracts direct with local farmers for fresh vegetables. An American manufacturer who desires to enter the British Market is immediately assured of an entry, with profit, and the chance of his own time to introduce his own products. This opportunity is unique.

BO-1340, Food Engineering
330 W. 42nd St., New York 18, N. Y.

CAPITAL & SERVICES AVAILABLE

Flavor Chemist Well Versed All Phases Production, Management, Technical Sales Ice Cream and Bakers Supplies, Will Invest Capital and Services in Established Food Manufacturing Firm. Only Bonifide Propositions by Principals Will Be Considered. Mutual Confidence Assured.

BO-1547, Food Engineering
330 W. 42nd St., New York 18, N. Y.

WANTED:
REACTION VESSEL

1000 to 2000 gallon stainless steel or 20% clad; 50 psi. internal pressure; 90 psi. jacket pressure; turbine agitator; flush bottom valve. Will consider accessories such as reflux condenser and 1,000,000 b.t.u. Dowtherm boiler.

S. C. JOHNSON & SON, INC.
Racine, Wisconsin

Additional Employment Ad on page 212

STAINLESS EQUIPMENT READY for SHIPMENT

Stainless Jacketed Kettles and Tanks from 50 gal. to 500 gal.

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500 gal. Stainless Jacketed Reactor or Evaporator

— • —

Swenson Stainless Continuous Evaporator with Barometric Leg

— • —

Langensenkamp Stainless Pulpers and CR Stainless Juice Extractors

— • —

Stainless Spray Dryers; 6' x 15' and 18' x 52'

— • —

Day Hercules 1400 lb. S.S. Do Mixer with 40 HP motor

— • —

2 Hormann S.S. Pressure Type Filters; cylinder 24" x 41"

The "3 GEAR" TRADEMARK IDENTIFIES a GOOD PIECE of EQUIPMENT

Trade in your old equipment for needed machinery; convert your surplus into cash . . . put them back to work where needed for defense.

2 Horix Rotary Aut. Vac. — Gravity Fillers in Stainless with 14 stems . . . complete Stainless Vacuum Fillers and Rotary Syphon Fillers; NEW Stokes & Smith Auger Type Dry Fillers with Vacuum Heads Filler Machine Co. Piston Fillers; 2 to 11 cylinders Sterling Model EM 1 D Dicers; also Sterling Peelers FMC 40" x 72" Retorts; also Horizontal Retorts up to 14'.

Struthers Wells Stainless Heat Exchanger; S.S. tubes; 1000 sq. ft.; Swenson Quadruple Effect Steel Evaporator; long tube vertical Filter Presses and Filters of every type; state requirements. 2 Savage 200 lb. Marshmallow Beaters; 2 Day Egg Clipper Mixers; Dry Powder Mixers and Blenders from 200 lb. to 7000 lbs. 3 Frigidaire 5 H. P. 5 Ton Air Conditioning Units.

FIRST MACHINERY CORP.

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EQUIPMENT FOR SALE

Misc. cookie bakery equipment including two 30 ft. traveling gas fired ovens taking 35" x 17" sheets, cooling tunnel, mixers, wire cut machines, cookie sheets, tree racks, etc. All equipment priced low.

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Model MPS. Cap. 2½" to 15" long, 1" to 9" wide, ½" to 5" high. Wraps and Heat Seals. Brand New—Never Used. Complete.

CARELL MACHINERY CO
107 Ogden St. Newark, N. J.

FOR SALE

1 U. S. Bacon Slicer—Model No. 3..1600.00
1 U. S. Bacon Slicer—Model No. 3..2000.00

Can be Inspected in Philadelphia. Offered as Is, Where Is, Subject to Prior Sale.

FS-1348, Food Engineering
330 W. 42nd St., New York 18, N. Y.

FOR SALE
EPPENBACH COLLOID MILL
ALMOST NEW

- Type QV7—1
- Newest Model—1950

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EQUIPMENT FOR SALE

A and M corn chip machine 5 years old in A1 condition. Capacity 250# hourly. Complete with massa grinder, press salter, oil storage, etc. Priced very reasonably.

FS-1214, Food Engineering
330 W. 42 St., New York 18, N. Y.

FILTER PRESS—Shriver—24"—Plate and Frame
FILTER PRESS—Johnson—30" x 30"—Plate and Frame
FILTER PRESS—Sperry—30" x 30"—recessed plate
KETTLE—60 Gal. SS—Double Motion Agitator
TANKS—S/S and Steel—All sizes to 3000 Gal.

AARON EQUIPMENT COMPANY

1347 S. Ashland Avenue
Chicago 8, Illinois
Phone: CHesapeake 3-5300

FOR SALE
100 gt. 6 speed Read Vertical Mixer
80 gt. 4 speed Hobart Vertical Mixer
No. 76 Enterprise Food Grinder, belt drive
Burns Peanut Roasters and Blanchers
No. 6 Royal Roaster, 75 lb. capacity
125, 200 and 250 lb. Nut Fryers
250 gallon Copper Steam Jacketed Kettle

SAVAGE BROS. CO.
2639 Gladys Ave. Chicago 12, Ill.

FOR SALE
One (1) RDH12 Disintegrator

Purchased 1946 and used 4 years. In top condition. Has 30 HP 3600 RPM Motor. Complete with spare unused Westinghouse 30 HP 3600 RPM motor—$1,675 FOB Lexington, Kentucky, or $1,250 without spare motor.

W. T. YOUNG FOODS, INC.
767 E. Third St. Lexington, Ky.

FOR SALE

Heavy Duty Burton Mixer incl. 3 H.P. Motor and Rev. Switch.
3 Steel Bins (12 ga.) 5' x 5' sq. 6' high.
2 #316 Stain. Steel Tanks. Cap. ea. 270 gal.

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5914 Merrill Ave. Cleveland 2, Ohio

IMMEDIATE DELIVERY

420 Gal. Steel Reactor, 48"x48", Jktd. & Agtd., with Exp. Proof motor
Island Equipment Unscrambler, Like New
9 Filter Presses, 12" to 42", All Metals
S.S. Model D Fitz Mill, 5 HP, Like New
World Twin Turret Late Model Automatic Labeler, complete, Like New
S.S. Tanks & Kettles in Stock
S.S. Single & 2 Piston Fillers, Like New
Pfaudler Steam Peeler, Late Model
2 S.S. Hand Pack Fillers
Pneumatic Scale Duplex Labeler, Front & Back, with 1 HP exp. motor, 5" centers

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Phone SOuth 8-4451 - 9264 - 8782
You can BANK on

EQUIPMENT CLEARING HOUSE, INC.

289-10th ST., BKLYN 15, N. Y.

FOR SALE

3000 gal. S.S. Truck Tanks and Trailers.
Plate Heat Exchanger, 58 S.S. Plates.
100 gal. S.S. Clad Jkt. Kettles, 30"x32".
150 & 200 gal. S.S. Mix. Tanks, water jkt.
300 to 4000 gal. Glass Lined Tanks.
Premier Colloid (Paste) Mill, 7½ H.P.
Model 18H Micro Pulverizer, 5 H.P.
125 to 1500 gal. Homogenizers or Viscolizers.
Model 148C Stokes High Vacuum Pump, 1½ H.P.
Ingersoll-Rand Centrifugal Pumps, 5 & 7½ H.P.
Tri-Clover S.S. Centrifugal Pump, ½ H.P.
No. 10BB Waukesha N.A. Pump, ¾ H.P.
28"x60" to 42"x120" Double Drum Dryers.
Hobart Grinder, 1½ H.P.
Model 08-20 Permutit Water Softener, 17 G.P.M.
Day Vibrating Screen, 40"x84", 1 H.P.
Milk Past., Coolers, Fillers, Washers, etc.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street New York 17, N. Y.
Murray Hill 2-4616

"QUICK — *Call*

CONSOLIDATED

1—H.P.M. Co. 500 Ton Curb Press, 24"x36" curb, with steam pump.
1—Mechanical 5'x16' jacketed Cooker or Dryer.
3—Steel 9500 gal. closed jacketed agitated Kettles.
1—400 gal. open s/s jacketed Kettle, 100# jacket pressure.
3—42" All Stainless Steel Centrifugals, Amer. T.&M. Co., each with s/s basket, curb, casing, shaft, unloader and 40 H.P. variable speed Slip Ring 3/60/400 v. 1200 rpm. motor with full controls. Suspended bottom discharge type. Now at Newark.
1—6'x50' Louisville welded shell Rotary Steam Tube Dryer, 2 rows, 54 tubes.
8—Oliver Vacuum Filters, incl. 8x12', 11'6x14', 11'6x18'.
8—8'x12' All Stainless Steel Feinc Rotary Continuous Vacuum Filter, string discharge, with blankets and Stainless Steel trough, repulper, receivers, vacuum pump, motors, reducers, etc. Shop #387.
1—4'x30' Stainless Steel lined Rotary Dryer, reducer and 10 H.P. motor.
1—18"x28" Bird Continuous Centrifugal Stainless Steel, copper housing, with 10 H.P. motor.
4—Swenson-Walker Jacketed Crystallizers in 10' sections, (1—70' lo. and 3—80' lo. each with pulley driven gear reducer, 10 H.P. A.C. motor). Units 24" I.D. x 26" high, with 3/8" steel plate and 1/4" steel jackets, steel covers, ribbon agitators.
2—Rotex Sifters, 40x84"; #11 20x48"; Day #71 Stainless Steel "Roball" Sifters, single deck, 40"x84, with 2 HP, 3/60/220 volt motors.
2—Mikro Pulverizers, #1 with 7½ H.P. motor and #2 Type 2W.
6—Mixing Tanks; 10'x7', with steam coils and agitators.
1—30"x30" Aluminum Filter Press; 45 chambers; 1" cake, side feed, open delivery, non-wash. Used on pectin.
4—100 Gal. Jacketed Aluminum Kettles; 2—125 Gal.
1—24" x 24" Plate and Frame Aluminum Filter Press, 24 Chambers.

Only A Partial List

CONSOLIDATED
PRODUCTS CO., INC.
13-17 PARK ROW
NEW YORK 38, N. Y.
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Editorial Items: Numbers on postcard correspond with those in the index below.

Advertisements: There is a page number on the postcard for each advertisement. Before the number may appear, L, R, T, B (left, right, top, bottom) locating the ad on the page; small letters following (a, b, c) indicate additional products in the advertisement.

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FOOD ENGINEERING

AUGUST, 1951

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